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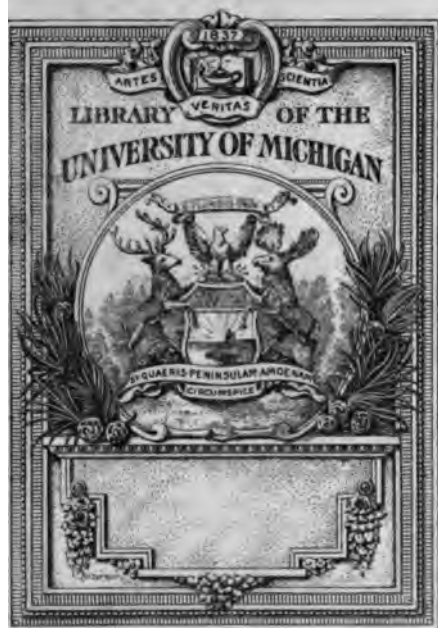
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THE
AMERICAN EPHEMERIS
AND
NAUTICAL ALMANAC

FOR THE YEAR

1915

PUBLISHED BY THE NAUTICAL ALMANAC OFFICE, U. S.
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1912

ERRATA.

The American Ephemeris, 1912.

Page.			
240,	Footnote, δ^2 Cham.	for 256'' s.	read 256'' n.
247,	Footnote, α Cygni	for f. 1'	read f. 1"
560,	Second eclipse, Moon's declination . . .	for 11 0 47.9 N.	read 11 0 53.1 N.
636,	Synodic Period, Satellite IX	for 580 4.7	read 523 15.6
650,	Bogota, Red. to Geoc. Lat.	for -11 51.5	read -1 51.5
654,	Lawrence, Geographic Latitude	for +36°	read +38°
657,	San Fernando, Long. from Greenwich . .	for +6 27 18.0	read +6 12 18.0

For other errata, 1912, see page iv of *The American Ephemeris*, 1913 and 1914.

The American Ephemeris, 1913.

240,	Footnote, δ^2 Cham.	for 256'' s.	read 256'' n.
247,	Footnote, α Cygni	for f. 1'	read f. 1"
572,	Second star	for ν Geminorum	read ν Geminorum
	Tenth star	for ν^1 Cancrī	read ν^1 Cancrī
	Eleventh star	for ν^2 Cancrī	read ν^2 Cancrī
657,	Synodic Period, Satellite IX	for 580 2.9	read 523 15.6
670,	Bogota, Red. to Geoc. Lat.	for -11 51.5	read -1 51.5
674,	Lawrence, Kans., Geographic Lat. . .	for +36°	read +38°
677,	San Fernando, Long. from Greenwich . .	for +6 27 18.0	read +6 12 18.0

For other errata, 1913, see page iv of *The American Ephemeris*, 1914.

The American Ephemeris, 1914.

137,	Dec. 32, Upper Transit, Diff. for 1 Hr. . .	for 2.20	read 2.21
240,	Footnote, δ^2 Cham.	for 256'' s.	read 256'' n.
247,	Footnote, α Cygni	for f. 1'	read f. 1"
526,	Jan. 21 U, Bright Limbs	for N.	read N.
549,	Dec. 31, Apparent Declination	for 47.4	read 47.5
558,	Dec. 32, Apparent Declination	for 2.3	read 2.4
657,	Synodic Period, Satellite IX	for 580 2.9	read 523 15.6
669,	Dec. 23 12 —	for δ	read δ
670,	Bogota, Red. to Geoc. Lat.	for -11 51.5	read -1 51.5
674,	Lawrence, Kans., Geographic Lat. . .	for +36°	read +38°
677,	San Fernando, Long. from Greenwich . .	for +6 27 18.0	read +6 12 18.0

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ANNIVERSARIES AND FESTIVALS, 1915.

New Year's Day	Friday, Jan. 1.
Epiphany	Wednesday, Jan. 6.
Septuagesima Sunday	Sunday, Jan. 31.
Lincoln's Birthday	Friday, Feb. 12.
Quinquagesima (Shrove Sunday)	Sunday, Feb. 14.
Ash Wednesday	Wednesday, Feb. 17.
Washington's Birthday	Monday, Feb. 22.
Palm Sunday	Sunday, Mar. 28.
First Day of Passover	Tuesday, Mar. 30.
Good Friday	Friday, Apr. 2.
Easter Sunday	Sunday, Apr. 4.
Rogation Sunday	Sunday, May 9.
Ascension Day (Holy Thursday)	Thursday, May 13.
Hebrew Pentecost (Shebuoth)	Wednesday, May 19.
Pentecost (Whit Sunday)	Sunday, May 23.
Memorial Day	Sunday, May 30.
Trinity Sunday	Sunday, May 30.
Corpus Christi	Thursday, June 3.
Independence Day	Sunday, July 4.
Labor Day (except in certain States)	Monday, Sept. 6.
Day of Atonement (Yom Kippur)	Saturday, Sept. 18.
First Day of Tabernacle (Succoth)	Thursday, Sept. 23.
Election Day (in some States)	Tuesday, Nov. 2.
Thanksgiving Day	Thursday, Nov. 25.
First Sunday in Advent	Sunday, Nov. 28.
Christmas Day	Saturday, Dec. 25.

INTRODUCTION.

The Ephemeris for the Meridian of Greenwich, comprising Part I of this volume, has been constructed from various tables of the Sun, Moon, and planets, as stated below, and the ephemerides of these bodies for the meridian of Washington contained in Part II have been computed from the same tables.

The Ephemeris of the Sun is constructed from NEWCOMB'S *Tables of the Sun, Astronomical Papers of the American Ephemeris*, Vol. VI, part 1.

The adopted value of the mean equatorial horizontal parallax of the Sun is $8''.80$, *Paris Conference, May, 1896*.

The Sun's rectangular equatorial coordinates are computed from the longitudes and latitudes by the following formulæ:

$$\begin{aligned} X &= R \cos \lambda \\ Y &= R \sin \lambda \cos \omega - 19.3 R \beta \\ Z &= R \sin \lambda \sin \omega + 44.5 R \beta \end{aligned}$$

The reductions to mean equinox are computed by the formulæ—

$$\begin{aligned} \Delta X &= +Y \sec \omega \Delta \lambda \sin 1'' \\ \Delta Y &= -X \cos \omega \Delta \lambda \sin 1'' + Z \Delta \omega \sin 1'' + 9.1 \tau R \sin (\lambda + 6^\circ) \\ \Delta Z &= -X \sin \omega \Delta \lambda \sin 1'' - Y \Delta \omega \sin 1'' - 21.0 \tau R \sin (\lambda + 6^\circ) \end{aligned}$$

where the numerical coefficients are in units of the seventh place of decimals and

R = the Sun's radius vector,

λ = the Sun's true longitude,

β = the Sun's true latitude, expressed in seconds of arc,

ω = the obliquity of the ecliptic,

$\Delta \lambda$ = the reduction of longitude for precession and nutation from the beginning of the Besselian fictitious year,

$\Delta \omega$ = the reduction of the mean to the apparent obliquity,

τ = the fraction of the year since the beginning of the Besselian fictitious year.

The longitude, latitude, and parallax of the Moon are derived from HANSEN'S *Tables de la Lune* (London, 1857), the mean longitude being corrected as in previous years, beginning with the volume for the year 1883. The statement concerning these corrections which is contained in the volumes from 1883 to 1911, inclusive, is erroneous, in that they have not been computed strictly in accordance with the formula in NEWCOMB'S *Researches on the Motion of the Moon*, part 1, page 268, *Washington Observations*, 1875, Appendix II. That formula is,

$$-1''.14 - 29''.17 T - 3''.86 T^2 - V_2 - 0''.09 \sin A - 15''.49 \cos A,$$

while the expression actually used is,

$$-1''.14 - 29''.17 T - 3''.76 T^2 - V_2 - 15''.49 \cos A.$$

In these formulæ T is the time in units of 100 years reckoned from 1800.

The ephemerides of Mercury, Venus, and Mars are derived from NEWCOMB'S tables of these planets, *Astronomical Papers of the American Ephemeris*, Vol. VI, parts 2, 3, and 4.

The ephemerides of Jupiter and Saturn are derived from the tables constructed in this office by GEORGE W. HILL, *Astronomical Papers of the American Ephemeris*, Vol. VII, parts 1 and 2.

The ephemerides of Uranus and Neptune are derived from NEWCOMB'S tables of these planets, *Astronomical Papers of the American Ephemeris*, Vol. VII, parts 3 and 4.

The nutation used in computing the ephemerides of the Sun, Moon, and planets has been taken from Tables XXXII and XXXIII of NEWCOMB'S Tables of the Sun, *Astronomical Papers of the American Ephemeris*, Vol. VI, part 1, and is given at intervals of five days on page 214. The formulæ from which the nutation is computed are as follows, the time interval T being expressed in units of 100 years, reckoned from 1900. See *Tables of the Sun*, page 26.

$$\begin{aligned}\delta\psi &= -(17''.234 + 0''.017 T) \sin \Omega & \delta\varepsilon &= +9''.214 \cos \Omega \\ &+ 0''.209 \sin 2 \Omega & &- 0''.090 \cos 2 \Omega \\ &+ 1''.257 \sin 2 L & &+ 0''.546 \cos 2 L \\ &- 0''.049 \sin (3 L + 78^\circ.7) & &+ 0''.021 \cos (3 L + 78^\circ.7) \\ &+ 0''.110 \sin (L + 75^\circ.3) & &- 0''.009 \cos (L - 78^\circ.7)\end{aligned}$$

The formulæ for the nutation used in computing the Besselian and Independent Star Numbers, pages 218–229, are as follows:

Terms of Long Period.	Terms of Short Period.
$\delta\psi = -(17''.234 + 0''.017 T) \sin \Omega$	$-0''.204 \sin 2 \mathcal{C}$
$+ 0''.209 \sin 2 \Omega$	$+ 0''.011 \sin (\mathcal{C} + I')$
$- 1''.272 \sin 2 L$	$+ 0''.068 \sin (\mathcal{C} - I')$
$+ 0''.126 \sin (L - I')$	$- 0''.034 \sin (2 \mathcal{C} - \Omega)$
$- 0''.050 \sin (3 L - I')$	$- 0''.026 \sin (3 \mathcal{C} - I')$
$+ 0''.021 \sin (L + I')$	$+ 0''.015 \sin (\mathcal{C} - 2 L + I')$
$+ 0''.012 \sin (2 L - \Omega)$	$+ 0''.006 \sin 2 (\mathcal{C} - L)$
$\delta\varepsilon = + (9''.210 + 0''.0009 T) \cos \Omega$	$+ 0''.088 \cos 2 \mathcal{C}$
$- 0''.090 \cos 2 \Omega$	$+ 0''.018 \cos (2 \mathcal{C} - \Omega)$
$+ 0''.552 \cos 2 L$	$+ 0''.011 \cos (3 \mathcal{C} - I')$
$+ 0''.022 \cos (3 L - I')$	$- 0''.005 \cos (\mathcal{C} + I')$
$- 0''.009 \cos (L + I')$	
$- 0''.007 \cos (2 L - \Omega)$	

The meaning of the symbols used and the manner in which these latter formulæ have been employed in computing the ephemerides of the stars, pages 251 to 510, are explained on pages 216 and 217. The slight discrepancy between the terms in $2 L$ in these two sets of formulæ is due to the correction of an error in the first set. See *Bulletin Astronomique*, 1898, Vol. XV, page 244.

The list of 825 stars contained in Part II has been selected from NEWCOMB'S Catalogue of Fundamental Stars, *Astronomical Papers of the American Ephemeris*, Vol. VIII, part 2. The mean places and annual variations of the stars have been taken from NEWCOMB'S Catalogue, except that those of ϵ Hydri, 38 Horologii (G.), and π Centauri have been taken from *Veroeffentlichungen des Koeniglichen Astronomischen Rechen-Instituts zu Berlin*, 1907, No. 33.

The relative accuracy with which the places of the stars are determined in both right ascension and declination may be estimated approximately from the mean errors for the year 1920, given on pages 511–517, and taken from *Astronomical Papers of the American Ephemeris*, Vol. VIII, part 2, pages 370–382.

The constants of aberration, precession, nutation, and obliquity of the ecliptic, used in the reduction of stars to apparent place, are given on pages 213 and 214, and the formulæ for the computation of the Besselian and Independent Star Numbers are given on page 216, the coefficients being those given by NEWCOMB in *Bulletin Astronomique*, 1898, Vol. XV, page 241.

The terms of short period of the nutation depending on the Moon's mean longitude are tabulated for Washington mean midnight of each day on pages 231–232, and have been computed from the formulæ for these terms given above.

The method by which the right ascensions and declinations of the stars interpolated from the 10-day ephemerides (pp. 287-486) are corrected for the effect of these short-period terms is given on page 217.

According to the formulæ on pages 216 and 217 the star constants $a, b, c, d, a', b', c', d'$ are computed for each star from its mean place at the beginning of the year, but if strict accuracy is required they should be computed from the star's mean place at date, and the following second-order terms should be added to the usual expressions for the reduction from mean to apparent place, namely—

$$\begin{array}{ll}
 \text{To } \alpha - \alpha_0 & \text{To } \delta - \delta_0 \\
 \left. \begin{array}{l}
 +0.000\ 003\ r^2 \sin \alpha \\
 -0.000\ 149\ r^2 \cos \alpha \\
 -0.000\ 0650\ r^2 \sin 2\alpha \\
 +0.000\ 0103\ \sin 2\ \odot \cos 2\alpha \\
 -0.000\ 0107\ \cos 2\ \odot \sin 2\alpha \\
 +0.000\ 0620\ \sin 2\ \odot \cos 2\alpha \\
 -0.000\ 0622\ \cos 2\ \odot \sin 2\alpha \\
 +0.000\ 0513\ \sin (\odot + \odot_0) \cos 2\alpha \\
 -0.000\ 0507\ \cos (\odot + \odot_0) \sin 2\alpha \\
 +0.000\ 0097\ \sin (\odot - \odot_0) \cos 2\alpha \\
 -0.000\ 0053\ \cos (\odot - \odot_0) \sin 2\alpha
 \end{array} \right\} \begin{array}{l} \tan \delta \\ \tan^2 \delta \\ \sec^2 \delta \\ \tan \delta \sec \delta \end{array} & \left. \begin{array}{l}
 +0.000\ 975\ r^2 \sin^2 \alpha \\
 -0.000\ 023\ \cos 2\ \odot \\
 -0.000\ 080\ \cos 2\ \odot \cos 2\alpha \\
 -0.000\ 077\ \sin 2\ \odot \sin 2\alpha \\
 +0.000\ 040\ \cos 2\ \odot \\
 -0.000\ 467\ \cos 2\ \odot \cos 2\alpha \\
 -0.000\ 465\ \sin 2\ \odot \sin 2\alpha \\
 -0.000\ 039\ \cos (\odot + \odot_0) \\
 -0.000\ 380\ \cos (\odot + \odot_0) \cos 2\alpha \\
 -0.000\ 385\ \sin (\odot + \odot_0) \sin 2\alpha \\
 -0.000\ 380\ \cos (\odot - \odot_0) \\
 -0.000\ 040\ \cos (\odot - \odot_0) \cos 2\alpha \\
 -0.000\ 072\ \sin (\odot - \odot_0) \sin 2\alpha
 \end{array} \right\} \begin{array}{l} \tan \delta \\ \sin \delta \tan \delta \end{array}
 \end{array}$$

These terms are negligible for stars whose declination is numerically less than 80° , but in computing the apparent places given in the American Ephemeris they have been applied whenever sensible.

The *apparent* places of α Canis Majoris (Sirius), α Canis Minoris (Procyon), α^2 Centauri, and 61 Cygni, have been corrected for the effect of annual parallax, the adopted constants of parallax being $0''.38$, $0''.27$, $0''.75$, and $0''.40$, respectively.

The *apparent* places of α Canis Majoris (Sirius), α Canis Minoris (Procyon), and α^2 Centauri, have been corrected for the effect of orbital motion. AUWERS'S elements were used for Sirius and Procyon, and SEE'S elements for α^2 Centauri. The values of these corrections are given on pages 98 and 99 of *Veröffentlichungen des Königlich Astronomischen Rechen-Instituts zu Berlin*, 1907, No. 33, but those for Sirius and Procyon need an additional correction to refer them to the center of the orbit before they are applicable to the mean places taken from NEWCOMB'S Fundamental Catalogue. These additional corrections for Sirius and Procyon were omitted in the Star List [Supplement to the American Ephemeris and Nautical Almanac] for 1910 and 1911, and in the American Ephemeris and Nautical Almanac for 1912 and 1913. The values of the corrections for the three stars are—

	Sirius.		Procyon.		α^2 Centauri.	
	1915.0	1916.0	1915.0	1916.0	1915.0	1916.0
$\Delta\alpha$	$-0''.140$	$-0''.142$	$-0''.061$	$-0''.062$	$+0''.669$	$+0''.658$
$\Delta\delta$	$-0''.32$	$-0''.46$	$-0''.20$	$-0''.08$	$+6''.51$	$+6''.25$

The values of $\Delta\alpha$ and $\Delta\delta$ which are given for the companions to the stars γ Andromedæ, ζ Ursæ Majoris and 61 Cygni, have been taken from the Greenwich 10-year catalogue for 1890, those for α Crucis from the Cape Catalogue for 1900, and those for α^2 Geminorum from DOBERCK'S elements given in the *Astronomische Nachrichten*, 1904, Vol. 166, page 145.

The magnitudes of the stars have, with a few exceptions, been taken from *Annals of the Harvard College Observatory*, Vol. L, 1908.

In general, the names of the stars are the same as in NEWCOMB'S Suggested List of Fundamental Stars, except that the FLAMSTEED number has been omitted in all cases where Greek or italic letters are available. In some cases the constellation and number of the uranometries of HEIS or GOULD have been used. In all such cases, Heis or the letter G in parentheses follows the constellation name, as, for example, 5 Cassiopeiæ (Heis) and 38 Horologii (G.).

The stars occulted by the Moon, pages 565-569, have been selected from the catalogue of zodiacal stars contained in Vol. VIII, part 3, *Astronomical Papers of the American Ephemeris*, and the mean places for 1915.0 have been derived from the same catalogue.

In Part III the elements of eclipses of the Sun and occultations of stars by the Moon are given in accordance with BESSEL'S method, the special forms employed being a modification of those developed in CHAUVENET'S *Spherical and Practical Astronomy*.

In the computation of the elements of Eclipses, the following corrections to the longitude, latitude, and parallax of the Moon, deduced by NEWCOMB from recent observations of occultations of stars by the Moon, have been applied. These corrections have been assumed in each case to be constant during the eclipse.

G. M. T.	δv	δb	$\delta \pi$
1915.	"	"	"
Feb. 13 ^d 16 ^h	+6.6	-0.4	+0.4
Aug. 10 11	+8.8	+0.4	+0.4

The satellites of Mars are computed from manuscript tables based upon elements deduced by WALTER S. HARSHMAN.

The eclipses of Jupiter's satellites are computed from a *Continuation of DAMOISEAU'S Tables*. The occultations, transits, etc., are computed from WOOLHOUSE'S tables, given in the *British Nautical Almanac* for 1835; Table II of each satellite having been adapted to DAMOISEAU'S tables.

The Vth satellite of Jupiter is computed from manuscript tables based upon unpublished elements deduced from the observations of BARNARD.

The differential coordinates of Jupiter's VIth and VIIth satellites have been computed from elements and tables given in *Lick Observatory Bulletin*, 1906, Vol. IV, No. 112, and in *Astronomische Nachrichten*, 1907, Vol. 174, page 359, respectively.

The elongations and conjunctions of the satellites and the positions of the rings of Saturn are computed from manuscript tables based on elements given by H. STRUVE in *Observations de Poulkova*, Supplement 1, St. Petersburg, 1888; *Publications de Poulkovo*, Second Series, Vol. XI, St. Petersburg, 1898; and *Astronomische Nachrichten*, 1903, Vol. 162, pages 325-344. The differential coordinates of Phœbe have been computed from elements and tables given in the *Annals of Harvard College Observatory*, 1905, Vol. LIII, No. VI.

The apparent dimensions of the rings of Saturn are computed from BESSEL'S data, except those for the dusky ring, which are based on the observations of various astronomers.

The elongations of the satellites of Uranus are computed from the data of NEWCOMB'S *Uranian and Neptunian Systems*, *Washington Observations*, 1873, Appendix I.

The elongations of the satellite of Neptune are computed from manuscript tables based upon elements given by A. HALL in the *Astronomical Journal*, 1898, Vol. XIX, page 65.

The adopted apparent semidiameter of the Sun at the Earth's mean distance is $16' 1''.50$; while in the computation of eclipses the value given by AUWERS in the *Astronomische Nachrichten*, 1891, Vol. 128, page 367, is employed, viz., $15' 59''.63$.

In the computation of the ephemeris for physical observations of the Sun, page 611, the following elements by CARRINGTON have been used:

Inclination of the Sun's equator to the ecliptic	$7^{\circ} 15'$
Longitude of the ascending node of the Sun's equator on the ecliptic	$73^{\circ} 40' + 50''.25 (t-1850)$
Sidereal period of rotation (mean solar days)	$25^d.38$

The apparent semidiameter of the Moon is computed from the Moon's equatorial horizontal parallax, π , by the formula,

$$S = 0.272\ 506\ \pi + 1''.50$$

where the constant 0.272 506 is based on data from occultations given by J. PETERS in the *Astronomische Nachrichten*, 1895, Vol. 138, page 147; and the constant $1''.50$ is added to cover the average effect of irradiation.

The value of the Moon's semidiameter employed in the computation of eclipses is computed from the formula,

$$S = 0.272\ 274\ \pi$$

The ephemeris for physical observations of the Moon, pages 612-619, has been computed from formulæ and elements given by F. HAYN in *Abhandlungen der K. Sächsischen Gesell. der Wissenschaften*, Vols. 29 and 30, 1904, 1907.

The notation used for the geocentric librations of the Moon is as follows:

- I = the mean inclination of the Moon's equator to the ecliptic ($= 1^{\circ} 32'.1$),
 Ω = the mean longitude of the Moon's ascending node, or the mean longitude of the descending node of the Moon's equator,
 C = the angle at the center of the Moon's disk made by a lunar meridian with the circle of declination, counted from north to east on the apparent disk,
 $\lambda, \beta, \alpha, \delta$ = the geocentric longitude, latitude, right ascension, and declination of the Moon,
 $i, \Delta, \Omega', \zeta$ = the quantities defined on page 212, where their values for the current year are given,
 g' = Earth's mean anomaly,
 g = Moon's mean anomaly,
 ω = Angular distance of Moon's perigee from the ascending node,
 b, l = Optical librations in latitude and longitude, respectively,
 $\delta b, \delta l$ = Physical librations in latitude and longitude, respectively,
 δC = Physical libration of C .

The Moon's geocentric librations in longitude and latitude or, in other words, the earth's selenographic longitude and latitude, are equal to $l + \delta l$ and $b + \delta b$, respectively, and may be found, for any time, by means of the following formulæ, in connection with the tables given on pages 212 and 213:—

$$\begin{aligned}\mu &= -0'.617 \sin 2 (\Omega - \lambda) \\ A &= \sin I \cos (\Omega - \lambda) \\ \tan B &= \tan I \sin (\Omega - \lambda) \\ \lambda' &= \lambda + \mu + A b \\ b &= B - \beta \\ l &= \lambda' - \zeta \\ \sin C &= \sin i \frac{\cos (\lambda' + \Delta - \Omega)}{\cos \delta} = -\sin i \frac{\cos (\alpha - \Omega')}{\cos b} \\ \delta b &= +108'' \sin (\omega + l) + 37'' \sin (\omega - l) - 11'' \sin (g + \omega - l) \\ \delta l &= +12'' \sin g - 59'' \sin g' - 18'' \sin 2\omega \\ &\quad - [108'' \cos (\omega + l) - 37'' \cos (\omega - l) + 11'' \cos (g + \omega - l)] \tan b \\ \delta C &= -[108'' \cos (\omega + l) - 37'' \cos (\omega - l) + 11'' \cos (g + \omega - l)] \sec b\end{aligned}$$

CHRONOLOGICAL ERAS AND CYCLES.

CHRONOLOGICAL ERAS.

THE YEAR 1915, WHICH COMPRISES THE LATTER PART OF THE 139TH AND THE BEGINNING OF THE 140TH YEAR OF THE INDEPENDENCE OF THE UNITED STATES OF AMERICA, CORRESPONDS TO—

The year 6628 of the Julian Period;

- “ 7423-7424 of the Byzantine era, the year 7424 commencing on September 1;
- “ 5675-5676 of the Jewish era, the year 5676 commencing on September 9, or, more exactly, at sunset on September 8;
- “ 2668 since the foundation of Rome, according to VARRO;
- “ 2662 since the beginning of the era of NABONASSAR, which has been assigned to Wednesday, the 26th of February of the 3967th year of the Julian Period; corresponding, in the notation of chronologists, to the 747th, and, in the notation of astronomers, to the 746th year before the birth of CHRIST;
- “ 2691 of the Olympiads, or the third year of the 673d Olympiad, commencing in July, 1915, if we fix the era of the Olympiads at 775½ years before CHRIST, or near the beginning of July of the year 3938 of the Julian Period;
- “ 2227 of the Grecian era, or the era of the SELEUCIDÆ, which began near the vernal equinox of the year, - 311 = B. C. 312, = 4402 of the Julian Period;
- “ 1631 of the era of DIOCLETIAN;
- “ 2575 of the Japanese era and to the 4th year of the period entitled Taisho.

The year 1334 of the Mohammedan era, or the era of the Hegira, begins on the 9th day of November, 1915.

The first day of January of the year 1915 is the 2,420,499th day since the commencement of the Julian Period.

CHRONOLOGICAL CYCLES.

Dominical Letter	C	Solar Cycle	20
Epact	14	Roman Indiction	13
Lunar Cycle or Golden Number	16	Julian Period	6628

ASTRONOMICAL CONSTANTS.

Solar Parallax	8.80	} Paris Conference.
Constant of Nutation	9.21	
Constant of Aberration	20.47	
General Precession	50''.2564 + 0''.000 222 (t - 1900)	} Newcomb.
Obliquity of the Ecliptic	23° 27' 8''.26 - 0''.4684 (t - 1900)	
Equatorial Horizontal Parallax of the Moon	57' 2''.63*	(Newcomb).
Mean distance Earth to Moon 384 395 kilometers=238 851 miles, or 60.2669 radii.		
Mean distance Earth to Sun 149 499 935 kilometers=92 894 767 statute miles.		
Velocity of light 299 860 kilometers=186 324 statute miles per second (Newcomb and Michelson).		

Light travels unit distance in 498^s.566.

Gaussian Gravitation Constant, $\dagger k = 0.017\ 202\ 099 = 3\ 548''.187\ 61$.

Acceleration in one sec. due to gravity, $g = 9.8060 - 0.0260 \cos 2\varphi - \frac{2h}{R} g \dagger$	} Helmert.
Length of seconds pendulum, $l = 0.993\ 549 - 0.002\ 631 \cos 2\varphi - \frac{2h}{R} l \dagger$	

Length of the year:

Tropical (ordinary)	365.242 198 79 - 0.000 000 0614 (t - 1900)	} Newcomb.
Sidereal	365.256 360 42 + 0.000 000 0011 (t - 1900)	
Anomalistic	365.259 641 34 + 0.000 000 0304 (t - 1900)	
Eclipse	346.620 000 + 0.000 000 36 (t - 1900)	

Length of the month:

Synodical (ordinary)	29.530 588 = 29 12 44 2.8	} Hansen.
Tropical	27.321 582 = 27 7 43 4.7	
Sidereal	27.321 661 = 27 7 43 11.5	
Anomalistic	27.554 550 = 27 13 18 33.1	
Nodical	27.212 219 = 27 5 5 35.7	

Length of the day:

Sidereal	23 56 4.091 of mean solar time.
Mean Solar	24 3 56.555 of sidereal time.

Dimensions of the Earth (Hayford's Spheroid of 1909):

Equatorial Radius, $a = 6378.388$ kilometers or 3963.34 statute miles.

Polar Radius, $b = 6356.909$ " or 3949.99 " "

$$\text{Flattening, } \frac{a-b}{a} = \frac{1}{297.0}$$

$$\text{Logarithm of the eccentricity } \frac{\sqrt{a^2 - b^2}}{a} = \log e = 8.913\ 804$$

$$\text{Logarithm radius} = \log \rho = 9.999\ 2695 + 0.000\ 7324 \cos 2\varphi - 0.000\ 0019 \cos 4\varphi.$$

Reduction from geographic latitude φ to geocentric latitude φ' ,

$$\varphi' - \varphi = -11' 35''.66 \sin 2\varphi + 1''.17 \sin 4\varphi.$$

1 meter = 3.280 8333 feet. 1 foot = 0.304 8006 meters.

1 statute mile = 0.868 392 nautical or geographical miles.

1 nautical mile = 1.151 553 statute miles.

* Used in the computation of eclipses. The parallax used in the computation of the ephemeris of the Moon contained in this volume is 57' 2''.23 (Hansen).

$\dagger k^2$ is the acceleration due to the Sun's attraction at the mean distance of the Earth from the Sun, which is also the astronomical unit of distance, the unit of time being one mean solar day.

$\ddagger \varphi$ = latitude, h = elevation above sea level in meters, and $\log R = 6.80416$.

NOTE.—The above values of $\log \rho$ and $\varphi' - \varphi$ were computed with the eccentricity that results from assuming that the flattening of the earth is exactly $\frac{1}{297}$.

ASTRONOMICAL CONSTANTS.

SEMI-DIAMETERS OF THE SUN, MOON, AND PLANETS.

Name.	At unit Distance. " "	At mean least Distance. " "	In Kilo-meters.	In Statute Miles.	Authority.
Sun	15 59.63	. .	695 533.61	432 183.68	Auwers.
Moon	15 32.58*	. .	1 737.96	1 079.91	Newcomb.
Mercury	3.34	5.45	2 420.82	1 504.24	Le Verrier.
Venus	8.55	30.90	6 197.01	3 850.67	Peirce.
Mars	5.05	9.64	3 660.22	2 274.37	Peirce.
Jupiter (Equatorial) . . .	1 40.20	23.84	72 624.56	45 127.16	Am. Eph.
Jupiter (Polar)	1 34.12	22.40	68 217.80	42 388.90	Peirce.
Saturn (Equatorial)	1 24.88	9.94	61 520.69	38 227.48	Barnard.
Saturn (Polar)	1 17.47	9.07	56 149.95	34 890.23	Barnard.
Uranus	33.52	1.84	24 295.16	15 096.43	Am. Eph.
Neptune	38.66	1.33	28 020.61	17 411.34	Am. Eph.

ELEMENTS OF THE PLANETARY ORBITS FOR THE EPOCH 1915—January 0^d G. M. T.

Name.	Mean Distance.	Sidereal Period in Tropical Years.	Sidereal mean daily Motion. " "	Synodic Period in Tropical Years.	Eccentricity.
☿ Mercury	0.387 099	0.240 85	14 732.420	0.317 26	0.205 6173
♀ Venus	0.723 331	0.615 21	5 767.670	1.598 72	0.006 8135
⊕ Earth	1.000 000	1.000 04	3 548.193	. . .	0.016 7448
♂ Mars	1.523 688	1.880 89	1 886.519	2.135 39	0.093 3225
♃ Jupiter	5.202 803	11.862 23	299.128	1.092 11	0.048 3620
♄ Saturn	9.538 843	29.457 72	120.455	1.035 18	0.055 8379
♅ Uranus	19.190 978	84.015 29	42.23	1.012 09	0.047 0865
♆ Neptune	30.070 672	164.788 29	21.53	1.006 14	0.008 5428

Name.	Inclination to the Ecliptic. " "	Mean Longitude of the Node. " "	Mean Longitude of the Perihelion. " "	Mean Longitude at the Epoch. " "	Logarithm of Mass in Unit of Sun's Mass.
☿ Mercury	7 0 11.4	47 19 25.3	76 7 58.8	276 13 13.51	3.221 8487—10
♀ Venus	3 23 37.6	75 54 52.6	130 22 30.0	119 26 49.99	4.389 3398—10
⊕ Earth . . . . .	. . .	. . .	101 28 43.3	99 4 22.04	4.482 2896—10
♂ Mars	1 51 1.0	48 54 5.8	334 29 40.4	284 36 34.04	3.509 5499—10
♃ Jupiter	1 18 28.5	99 35 22.4	12 57 11.8	333 25 58.17	6.979 9082—10
♄ Saturn	2 29 30.1	112 54 51.8	91 22 57.3	90 3 59.41	6.455 7335—10
♅ Uranus	0 46 21.9	73 33 56.5	169 17 18.6	307 50 20.14	5.640 7528—10
♆ Neptune	1 46 40.1	130 50 37.5	43 53 12.1	118 0 1.18	5.705 5338—10

The elements of the four inner planets are derived from those given by NEW-COMB in Vol. VI of the *Astronomical Papers of the American Ephemeris*, and are the same as those used in computing the ephemerides of these planets. Those of Jupiter, Saturn, Uranus, and Neptune are taken from Vol. VII of the *Astronomical Papers* for the epoch of the tables. They are reduced to 1915 by applying LE VERRIER'S variations, and can not be regarded as being strictly identical with the elements used in computing the ephemerides of those planets in this volume.

* At mean distance. See *Ast. Papers Am. Eph.*, Vol. IX, p. 39. For the values of the semidiameter used in this volume see page xi.

SYMBOLS AND ABBREVIATIONS.

SIGNS OF THE PLANETS, ETC.

☉	The Sun.	♂	Mars.
☾	The Moon.	♃	Jupiter.
☿	Mercury.	♄	Saturn.
♀	Venus.	♅	Uranus.
♁	The Earth.	♆	Neptune.

SIGNS OF THE ZODIAC.

Spring Signs.	{	1.	♈	Aries.	Autumn Signs.	{	7.	♎	Libra.
		2.	♉	Taurus.			8.	♏	Scorpius.
		3.	♊	Gemini.			9.	♐	Sagittarius.
Summer Signs.	{	4.	♋	Cancer.	Winter Signs.	{	10.	♑	Capricornus.
		5.	♌	Leo.			11.	♒	Aquarius.
		6.	♍	Virgo.			12.	♓	Pisces.

ASPECTS.

- ☌ Conjunction, or having the same Longitude or Right Ascension.
 ☐ Quadrature, or differing $\pm 90^\circ$ in Longitude or Right Ascension.
 ☌ Opposition, or differing 180° in Longitude or Right Ascension.

ABBREVIATIONS.

♈	Ascending Node.	°	Degrees.
♏	Descending Node.	'	Minutes of Arc.
N.	North.	"	Seconds of Arc.
S.	South.	h	Hours.
E.	East.	m	Minutes of Time.
W.	West.	s	Seconds of Time.

PART I.

ASTRONOMICAL EPHEMERIS FOR THE MERIDIAN OF GREENWICH.

AT GREENWICH APPARENT NOON.

Day of the Week.	Day of the Month.	THE SUN'S					Sidereal Time of Semidiameter Passing Meridian.	Equation of Time, to be Added to Apparent Time.	Diff. for Hour.
		Apparent Right Ascension.	Diff. for 1 Hour.	Apparent Declination.	Diff. for 1 Hour.	Semidiameter.			
		h m s	s	" ' "	"	" "	s	m s	s
Fri.	1	18 43 32.64	11.047	S.23 4 29.1	+11.49	16 17.90	71.08	3 18.89	1.189
Sat.	2	18 47 57.65	11.035	22 59 39.6	12.64	16 17.90	71.04	3 47.26	1.175
SUN.	3	18 52 22.33	11.021	22 54 22.6	13.78	16 17.90	70.99	4 15.30	1.161
Mon.	4	18 56 46.66	11.006	22 48 38.2	+14.91	16 17.89	70.94	4 43.00	1.146
Tues.	5	19 1 10.62	10.990	22 42 26.6	16.04	16 17.88	70.88	5 10.32	1.130
Wed.	6	19 5 34.16	10.972	22 35 48.0	17.16	16 17.86	70.82	5 37.23	1.112
Thur.	7	19 9 57.28	10.953	22 28 42.5	+18.28	16 17.84	70.76	6 3.72	1.094
Fri.	8	19 14 19.94	10.934	22 21 10.4	19.39	16 17.81	70.69	6 29.75	1.075
Sat.	9	19 18 42.13	10.914	22 13 11.8	20.49	16 17.77	70.62	6 55.31	1.054
SUN.	10	19 23 3.80	10.892	22 4 46.9	+21.58	16 17.73	70.55	7 20.35	1.032
Mon.	11	19 27 24.94	10.869	21 55 56.1	22.66	16 17.69	70.48	7 44.87	1.010
Tues.	12	19 31 45.52	10.845	21 46 39.6	23.72	16 17.64	70.40	8 8.83	0.986
Wed.	13	19 36 5.52	10.820	21 36 57.5	+24.77	16 17.58	70.32	8 32.20	0.961
Thur.	14	19 40 24.90	10.794	21 26 50.3	25.82	16 17.52	70.23	8 54.96	0.935
Fri.	15	19 44 43.65	10.767	21 16 18.2	26.85	16 17.46	70.14	9 17.09	0.908
Sat.	16	19 49 1.73	10.739	21 5 21.6	+27.87	16 17.39	70.05	9 38.56	0.880
SUN.	17	19 53 19.13	10.710	20 54 0.7	28.87	16 17.32	69.95	9 59.34	0.851
Mon.	18	19 57 35.82	10.680	20 42 15.9	29.85	16 17.25	69.85	10 19.41	0.821
Tues.	19	20 1 51.77	10.649	20 30 7.6	+30.83	16 17.18	69.75	10 38.76	0.790
Wed.	20	20 6 6.99	10.618	20 17 36.1	31.79	16 17.10	69.65	10 57.36	0.759
Thur.	21	20 10 21.44	10.586	20 4 41.8	32.73	16 17.02	69.55	11 15.20	0.727
Fri.	22	20 14 35.11	10.553	19 51 25.0	+33.66	16 16.93	69.45	11 32.28	0.695
Sat.	23	20 18 48.00	10.520	19 37 46.1	34.57	16 16.84	69.35	11 48.56	0.662
SUN.	24	20 23 0.09	10.487	19 23 45.4	35.47	16 16.74	69.24	12 4.06	0.629
Mon.	25	20 27 11.38	10.453	19 9 23.4	+36.35	16 16.63	69.13	12 18.75	0.595
Tues.	26	20 31 21.86	10.419	18 54 40.4	37.22	16 16.52	69.02	12 32.63	0.561
Wed.	27	20 35 31.51	10.385	18 39 36.8	38.07	16 16.41	68.91	12 45.69	0.527
Thur.	28	20 39 40.34	10.351	18 24 12.9	+38.91	16 16.29	68.80	12 57.93	0.493
Fri.	29	20 43 48.35	10.316	18 8 29.2	39.73	16 16.17	68.69	13 9.35	0.459
Sat.	30	20 47 55.54	10.282	17 52 26.0	40.53	16 16.04	68.57	13 19.96	0.425
SUN.	31	20 52 1.90	10.248	17 36 3.7	41.32	16 15.90	68.45	13 29.73	0.391
Mon.	32	20 56 7.44	10.214	S.17 19 22.7	+42.09	16 15.76	68.33	13 38.69	0.357

NOTE.—The mean time of semidiameter passing the meridian may be found by subtracting 0.19 from the sidereal time.

The sign + prefixed to the hourly change of declination indicates that south declinations are decreasing.

AT GREENWICH MEAN NOON.

Day of the Month.	THE SUN'S				Equation of Time, to be Subtracted from Mean Time.	Diff. for 1 Hour.	Sidereal Time, or Right Ascen- sion of Mean Sun.
	Apparent Right Ascension.	Diff. for 1 Hour.	Apparent Decli- nation.	Diff. for 1 Hour.			
	h m s	s	° ' "	"	m s	s	h m s
i.	1 18 43 32.03	11.043	S. 23 4 29.7	+11.49	3 18.82	1.189	18 40 13.21
t.	2 18 47 56.96	11.031	22 59 40.4	12.63	3 47.18	1.175	18 44 9.77
/N.	3 18 52 21.55	11.017	22 54 23.5	13.77	4 15.22	1.161	18 48 6.33
m.	4 18 56 45.80	11.002	22 48 39.3	+14.90	4 42.91	1.146	18 52 2.89
es.	5 19 1 9.67	10.986	22 42 28.0	16.02	5 10.22	1.130	18 55 59.45
ed.	6 19 5 33.13	10.969	22 35 49.6	17.15	5 37.13	1.112	18 59 56.01
ur.	7 19 9 56.18	10.951	22 28 44.3	+18.27	6 3.61	1.094	19 3 52.57
i.	8 19 14 18.76	10.932	22 21 12.5	19.38	6 29.64	1.075	19 7 49.13
t.	9 19 18 40.87	10.911	22 13 14.1	20.48	6 55.18	1.054	19 11 45.68
/N.	10 19 23 2.47	10.889	22 4 49.6	+21.56	7 20.23	1.032	19 15 42.24
on.	11 19 27 23.54	10.866	21 55 59.0	22.64	7 44.74	1.010	19 19 38.80
es.	12 19 31 44.05	10.842	21 46 42.8	23.71	8 8.69	0.986	19 23 35.36
ed.	13 19 36 3.98	10.818	21 37 1.0	+24.76	8 32.06	0.961	19 27 31.92
ur.	14 19 40 23.30	10.792	21 26 54.1	25.81	8 54.82	0.935	19 31 28.48
i.	15 19 44 41.98	10.765	21 16 22.3	26.84	9 16.95	0.908	19 35 25.03
t.	16 19 49 0.01	10.737	21 5 26.0	+27.85	9 38.42	0.880	19 39 21.59
/N.	17 19 53 17.34	10.708	20 54 5.5	28.85	9 59.20	0.851	19 43 18.15
on.	18 19 57 33.98	10.678	20 42 21.1	29.84	10 19.27	0.821	19 47 14.71
es.	19 20 1 49.88	10.647	20 30 13.1	+30.82	10 38.62	0.790	19 51 11.27
ed.	20 20 6 5.05	10.616	20 17 41.9	31.78	10 57.22	0.759	19 55 7.82
ur.	21 20 10 19.45	10.584	20 4 48.0	32.72	11 15.07	0.727	19 59 4.38
i.	22 20 14 33.08	10.552	19 51 31.5	+33.65	11 32.14	0.695	20 3 0.94
t.	23 20 18 45.93	10.519	19 37 52.9	34.56	11 48.43	0.662	20 6 57.50
/N.	24 20 22 57.98	10.485	19 23 52.6	35.46	12 3.93	0.629	20 10 54.06
on.	25 20 27 9.24	10.452	19 9 30.9	+36.34	12 18.62	0.595	20 14 50.61
es.	26 20 31 19.68	10.418	18 54 48.2	37.21	12 32.51	0.561	20 18 47.17
ed.	27 20 35 29.30	10.384	18 39 44.9	38.06	12 45.58	0.527	20 22 43.73
ur.	28 20 39 38.11	10.350	18 24 21.3	+38.90	12 57.83	0.493	20 26 40.28
i.	29 20 43 46.09	10.316	18 8 37.9	39.72	13 9.25	0.459	20 30 36.84
t.	30 20 47 53.26	10.281	17 52 35.0	40.52	13 19.86	0.425	20 34 33.40
/N.	31 20 51 59.60	10.247	17 36 13.0	41.31	13 29.64	0.391	20 38 29.95
on.	32 20 56 5.12	10.213	S. 17 19 32.2	+42.08	13 38.61	0.357	20 42 26.51

NOTE.—The semidiameter for mean noon may be assumed the same as that for apparent noon.
The sign + prefixed to the hourly change of declination indicates that south declinations are decreasing.

Diff. for 1 Hour,
+0.8565.
(Table III.)

AT GREENWICH MEAN NOON.

Day of the Month.	Day of the Year.	THE SUN'S						Logarithm of the Radius Vector of the Earth.	Diff. for 1 Hour.	Mean Time of Sidereal Noon.
		True Longitude.		Diff. for 1 Hour.	Latitude.					
		l	l'							
1	1	280 0 32.9	0 23.8	152.85	+0.43	9.992 6547	-1.5	5 18 54.39		
2	2	281 1 41.3	1 32.0	152.85	0.33	9.992 6526	-0.3	5 14 58.48		
3	3	282 2 49.8	2 40.3	152.85	0.22	9.992 6533	+0.9	5 11 2.57		
4	4	283 3 58.4	3 48.6	152.86	+0.09	9.992 6568	+2.0	5 7 6.66		
5	5	284 5 7.1	4 57.2	152.86	-0.04	9.992 6631	3.2	5 3 10.74		
6	6	285 6 15.9	6 5.8	152.87	0.17	9.992 6720	4.3	4 59 14.83		
7	7	286 7 24.9	7 14.6	152.87	-0.29	9.992 6836	+5.3	4 55 18.92		
8	8	287 8 33.9	8 23.5	152.88	0.39	9.992 6976	6.3	4 51 23.01		
9	9	288 9 43.1	9 32.5	152.88	0.47	9.992 7138	7.2	4 47 27.10		
10	10	289 10 52.4	10 41.5	152.89	-0.52	9.992 7323	+8.1	4 43 31.18		
11	11	290 12 1.7	11 50.6	152.89	0.54	9.992 7527	8.9	4 39 35.27		
12	12	291 13 10.9	12 59.6	152.88	0.53	9.992 7750	9.7	4 35 39.36		
13	13	292 14 20.0	14 8.6	152.87	-0.48	9.992 7990	+10.4	4 31 43.44		
14	14	293 15 28.8	15 17.2	152.86	0.40	9.992 8247	11.0	4 27 47.53		
15	15	294 16 37.3	16 25.5	152.84	0.29	9.992 8520	11.7	4 23 51.62		
16	16	295 17 45.4	17 33.4	152.82	-0.17	9.992 8807	+12.3	4 19 55.71		
17	17	296 18 52.8	18 40.7	152.80	-0.03	9.992 9111	13.0	4 15 59.80		
18	18	297 19 59.7	19 47.3	152.77	+0.10	9.992 9430	13.7	4 12 3.88		
19	19	298 21 5.7	20 53.2	152.74	+0.23	9.992 9767	+14.4	4 8 7.97		
20	20	299 22 10.9	21 58.2	152.70	0.35	9.993 0121	15.1	4 4 12.06		
21	21	300 23 15.2	23 2.3	152.66	0.46	9.993 0494	15.9	4 0 16.15		
22	22	301 24 18.6	24 5.5	152.62	+0.54	9.993 0887	+16.8	3 56 20.24		
23	23	302 25 20.9	25 7.7	152.58	0.60	9.993 1300	17.7	3 52 24.32		
24	24	303 26 22.3	26 8.9	152.54	0.63	9.993 1734	18.6	3 48 28.41		
25	25	304 27 22.6	27 9.1	152.49	+0.63	9.993 2191	+19.5	3 44 32.50		
26	26	305 28 21.8	28 8.2	152.44	0.61	9.993 2670	20.5	3 40 36.59		
27	27	306 29 20.0	29 6.0	152.39	0.57	9.993 3174	21.5	3 36 40.68		
28	28	307 30 17.0	30 2.9	152.35	+0.50	9.993 3702	+22.5	3 32 44.77		
29	29	308 31 13.0	30 58.7	152.31	0.41	9.993 4255	23.6	3 28 48.86		
30	30	309 32 7.9	31 53.5	152.27	0.30	9.993 4833	24.6	3 24 52.95		
31	31	310 33 1.7	32 47.1	152.22	0.17	9.993 5438	25.7	3 20 57.04		
32	32	311 33 54.5	33 39.8	152.18	+0.03	9.993 6068	+26.8	3 17 1.12		

NOTE.—The longitudes in the column λ are referred to the true equinox of their own date, while those in the column λ' are referred to the mean equinox of the beginning of the Besselian fictitious year.

Diff. for 1 Hour,
— g . 8296,
(Table II.)

GREENWICH MEAN TIME.

Day of the Month.	THE MOON'S								
	SEMIDIAMETER.		HORIZONTAL PARALLAX.				UPPER TRANSIT.		AGE.
	Noon.	Midnight.	Noon.	Diff. for 1 Hour.	Midnight.	Diff. for 1 Hour.	Meridian of Greenwich.	Diff. for 1 Hour.	Noon.
	' "	' "	' "	"	' "	"	h m	m	d
1	15 8.4	15 12.1	55 27.96	+1.126	55 41.69	+1.160	12 30.6	2.21	15.4
2	15 16.0	15 19.9	55 55.75	1.183	56 10.06	1.200	13 22.7	2.13	16.4
3	15 23.8	15 27.8	56 24.52	1.209	56 39.05	1.212	14 12.6	2.03	17.4
4	15 31.7	15 35.7	56 53.60	+1.212	57 8.14	+1.211	15 0.3	1.95	18.4
5	15 39.6	15 43.6	57 22.66	1.208	57 37.13	1.203	15 46.4	1.90	19.4
6	15 47.5	15 51.4	57 51.52	1.195	58 5.79	1.183	16 32.0	1.90	20.4
7	15 55.2	15 59.0	58 19.89	+1.166	58 33.74	+1.140	17 18.3	1.97	21.4
8	16 2.7	16 6.2	58 47.20	1.101	59 0.11	1.048	18 6.8	2.09	22.4
9	16 9.5	16 12.6	59 12.27	0.976	59 23.44	0.882	18 58.9	2.26	23.4
10	16 15.2	16 17.5	59 33.35	+0.764	59 41.68	+0.620	19 55.4	2.45	24.4
11	16 19.3	16 20.4	59 48.12	0.450	59 52.37	+0.255	20 56.4	2.62	25.4
12	16 20.9	16 20.7	59 54.14	+0.037	59 53.18	-0.199	22 0.4	2.69	26.4
13	16 19.6	16 17.7	59 49.32	-0.446	59 42.47	-0.696	23 4.4	2.62	27.4
14	16 15.1	16 11.6	59 32.62	0.944	59 19.86	1.179	6	.	28.4
15	16 7.4	16 2.5	59 4.40	1.393	58 46.53	1.580	0 5.4	2.45	29.4
16	15 57.1	15 51.2	58 26.61	-1.734	58 5.07	-1.850	1 1.5	2.23	0.9
17	15 45.0	15 38.6	57 42.38	1.926	57 19.02	1.961	1 52.5	2.02	1.9
18	15 32.2	15 25.9	56 55.49	1.954	56 32.27	1.910	2 39.0	1.87	2.9
19	15 19.8	15 14.0	56 9.80	-1.829	55 48.49	-1.718	3 22.4	1.76	3.9
20	15 8.6	15 3.7	55 28.69	1.578	55 10.72	1.413	4 3.9	1.71	4.9
21	14 59.4	14 55.7	54 54.85	1.229	54 41.28	1.030	4 44.8	1.71	5.9
22	14 52.6	14 50.3	54 30.17	-0.820	54 21.63	-0.603	5 26.3	1.75	6.9
23	14 48.7	14 47.8	54 15.72	-0.382	54 12.47	-0.160	6 9.3	1.84	7.9
24	14 47.6	14 48.2	54 11.88	+0.060	54 13.89	+0.273	6 54.7	1.95	8.9
25	14 49.4	14 51.3	54 18.40	+0.477	54 25.28	+0.668	7 43.0	2.07	9.9
26	14 53.8	14 56.8	54 34.38	0.846	54 45.52	1.007	8 34.0	2.18	10.9
27	15 0.3	15 4.3	54 58.47	1.148	55 12.98	1.266	9 27.2	2.24	11.9
28	15 8.6	15 13.2	55 28.76	+1.360	55 45.54	+1.433	10 21.0	2.24	12.9
29	15 17.9	15 22.8	56 3.04	1.479	56 20.93	1.498	11 14.3	2.19	13.9
30	15 27.7	15 32.5	56 38.88	1.490	56 56.61	1.461	12 5.8	2.10	14.9
31	15 37.2	15 41.7	57 13.85	1.410	57 30.36	1.339	12 55.3	2.02	15.9
32	15 46.0	15 49.9	57 45.91	+1.250	58 0.31	+1.149	13 43.0	1.95	16.9

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
FRIDAY 1.					SUNDAY 3.				
0	h m s	s	° ' "	"	0	h m s	s	° ' "	"
0	6 44 4.38	2.3162	N. 26 51 17.2	4.257	0	8 32 24.98	2.1793	N. 20 50 4.3	10.514
1	6 46 23.31	2.3148	26 46 57.4	4.402	1	8 34 35.63	2.1757	20 39 30.1	10.624
2	6 48 42.16	2.3134	26 42 28.9	4.547	2	8 36 46.06	2.1720	20 28 49.4	10.732
3	6 51 0.92	2.3118	26 37 51.8	4.691	3	8 38 56.27	2.1683	20 18 2.2	10.841
4	6 53 19.58	2.3102	26 33 6.0	4.834	4	8 41 6.26	2.1647	20 7 8.5	10.949
5	6 55 38.14	2.3084	26 28 11.7	4.977	5	8 43 16.03	2.1610	19 56 8.4	11.054
6	6 57 56.59	2.3067	26 23 8.8	5.120	6	8 45 25.58	2.1573	19 45 2.0	11.159
7	7 0 14.94	2.3048	26 17 57.3	5.262	7	8 47 34.91	2.1538	19 33 49.3	11.262
8	7 2 33.17	2.3028	26 12 37.3	5.404	8	8 49 44.03	2.1502	19 22 30.5	11.365
9	7 4 51.28	2.3008	26 7 8.8	5.545	9	8 51 52.93	2.1465	19 11 5.5	11.467
10	7 7 9.26	2.2986	26 1 31.9	5.686	10	8 54 1.61	2.1428	18 59 34.4	11.568
11	7 9 27.11	2.2964	25 55 46.5	5.827	11	8 56 10.07	2.1393	18 47 57.3	11.668
12	7 11 44.83	2.2942	25 49 52.7	5.966	12	8 58 18.32	2.1357	18 36 14.2	11.767
13	7 14 2.41	2.2918	25 43 50.6	6.105	13	9 0 26.35	2.1322	18 24 25.3	11.864
14	7 16 19.85	2.2894	25 37 40.1	6.244	14	9 2 34.18	2.1287	18 12 30.5	11.961
15	7 18 37.14	2.2869	25 31 21.3	6.382	15	9 4 41.79	2.1252	18 0 30.0	12.056
16	7 20 54.28	2.2844	25 24 54.2	6.520	16	9 6 49.20	2.1217	17 48 23.8	12.150
17	7 23 11.27	2.2818	25 18 18.9	6.657	17	9 8 56.39	2.1182	17 36 12.0	12.243
18	7 25 28.10	2.2792	25 11 35.4	6.793	18	9 11 3.38	2.1148	17 23 54.6	12.336
19	7 27 44.77	2.2764	25 4 43.7	6.928	19	9 13 10.16	2.1113	17 11 31.7	12.427
20	7 30 1.27	2.2736	24 57 44.0	7.063	20	9 15 16.74	2.1080	16 59 3.4	12.517
21	7 32 17.60	2.2708	24 50 36.1	7.198	21	9 17 23.12	2.1047	16 46 29.7	12.606
22	7 34 33.76	2.2678	24 43 20.2	7.331	22	9 19 29.30	2.1013	16 33 50.7	12.694
23	7 36 49.74	2.2648	N. 24 35 56.4	7.463	23	9 21 35.28	2.0981	N. 16 21 6.4	12.781
SATURDAY 2.					MONDAY 4.				
0	7 39 5.54	2.2618	N. 24 28 24.6	7.596	0	9 23 41.07	2.0949	N. 16 8 17.0	12.866
1	7 41 21.16	2.2588	24 20 44.9	7.727	1	9 25 46.67	2.0917	15 55 22.5	12.951
2	7 43 36.60	2.2558	24 12 57.4	7.857	2	9 27 52.07	2.0884	15 42 22.9	13.034
3	7 45 51.85	2.2525	24 5 2.0	7.987	3	9 29 57.28	2.0853	15 29 18.4	13.116
4	7 48 6.90	2.2493	23 56 58.9	8.117	4	9 32 2.31	2.0823	15 16 9.0	13.197
5	7 50 21.77	2.2462	23 48 48.0	8.245	5	9 34 7.15	2.0792	15 2 54.7	13.278
6	7 52 36.44	2.2428	23 40 29.5	8.372	6	9 36 11.81	2.0762	14 49 35.6	13.357
7	7 54 50.91	2.2395	23 32 3.4	8.498	7	9 38 16.29	2.0733	14 36 11.9	13.434
8	7 57 5.18	2.2362	23 23 29.7	8.624	8	9 40 20.60	2.0703	14 22 43.5	13.511
9	7 59 19.25	2.2328	23 14 48.5	8.749	9	9 42 24.73	2.0674	14 9 10.6	13.587
10	8 1 33.12	2.2294	23 5 59.8	8.873	10	9 44 28.69	2.0647	13 55 33.1	13.662
11	8 3 46.78	2.2259	22 57 3.7	8.996	11	9 46 32.49	2.0619	13 41 51.2	13.734
12	8 6 0.23	2.2224	22 48 0.3	9.118	12	9 48 36.12	2.0592	13 28 5.0	13.807
13	8 8 13.47	2.2189	22 38 40.5	9.240	13	9 50 39.50	2.0565	13 14 14.4	13.877
14	8 10 26.50	2.2154	22 29 31.5	9.361	14	9 52 42.90	2.0539	13 0 19.7	13.947
15	8 12 39.32	2.2119	22 20 6.2	9.481	15	9 54 46.06	2.0514	12 46 20.7	14.017
16	8 14 51.93	2.2083	22 10 33.8	9.598	16	9 56 49.07	2.0489	12 32 17.7	14.084
17	8 17 4.32	2.2048	22 0 54.4	9.716	17	9 58 51.93	2.0464	12 18 10.6	14.151
18	8 19 16.50	2.2012	21 51 7.9	9.833	18	10 0 54.64	2.0441	12 3 59.6	14.217
19	8 21 28.46	2.1975	21 41 14.4	9.949	19	10 2 57.22	2.0418	11 49 44.6	14.282
20	8 23 40.20	2.1939	21 31 14.0	10.064	20	10 4 59.65	2.0394	11 35 25.8	14.344
21	8 25 51.73	2.1903	21 21 6.7	10.178	21	10 7 1.95	2.0373	11 21 3.3	14.406
22	8 28 3.03	2.1866	21 10 52.6	10.291	22	10 9 4.12	2.0351	11 6 37.1	14.467
23	8 30 14.12	2.1829	21 0 31.8	10.402	23	10 11 6.16	2.0330	10 52 7.2	14.527
24	8 32 24.98	2.1793	N. 20 50 4.3	10.514	24	10 13 8.08	2.0310	N. 10 37 33.8	14.586

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
TUESDAY 5.					THURSDAY 7.				
0	h m s	s	N. ° ' "	"	0	h m s	s	S. ° ' "	"
0	10 13 8.08	2.0310	10 37 33.8	14.586	0	11 49 41.10	2.0228	1 48 23.7	16.044
1	10 15 9.88	2.0291	10 22 56.9	14.643	1	11 51 42.52	2.0247	2 4 26.4	16.045
2	10 17 11.57	2.0272	10 8 16.6	14.700	2	11 53 44.06	2.0267	2 20 29.1	16.044
3	10 19 13.14	2.0253	9 53 32.9	14.755	3	11 55 45.72	2.0287	2 36 31.7	16.042
4	10 21 14.61	2.0237	9 38 46.0	14.809	4	11 57 47.50	2.0308	2 52 34.2	16.040
5	10 23 15.98	2.0219	9 23 55.8	14.862	5	11 59 49.42	2.0331	3 8 36.5	16.036
6	10 25 17.24	2.0203	9 9 2.5	14.914	6	12 1 51.47	2.0354	3 24 38.5	16.030
7	10 27 18.41	2.0188	8 54 6.1	14.965	7	12 3 53.67	2.0379	3 40 40.1	16.023
8	10 29 19.49	2.0173	8 39 6.7	15.015	8	12 5 56.02	2.0404	3 56 41.3	16.016
9	10 31 20.48	2.0159	8 24 4.3	15.064	9	12 7 58.52	2.0430	4 12 42.0	16.007
10	10 33 21.40	2.0146	8 8 59.0	15.112	10	12 10 1.18	2.0458	4 28 42.1	15.996
11	10 35 22.23	2.0133	7 53 50.9	15.158	11	12 12 4.01	2.0485	4 44 41.5	15.983
12	10 37 22.99	2.0121	7 38 40.1	15.202	12	12 14 7.00	2.0513	5 0 40.1	15.970
13	10 39 23.68	2.0110	7 23 26.6	15.246	13	12 16 10.17	2.0544	5 16 37.9	15.955
14	10 41 24.31	2.0099	7 8 10.6	15.288	14	12 18 13.53	2.0575	5 32 34.7	15.939
15	10 43 24.87	2.0089	6 52 52.0	15.331	15	12 20 17.07	2.0606	5 48 30.6	15.922
16	10 45 25.38	2.0081	6 37 30.9	15.372	16	12 22 20.80	2.0638	6 4 25.4	15.903
17	10 47 25.84	2.0073	6 22 7.4	15.411	17	12 24 24.73	2.0673	6 20 19.0	15.883
18	10 49 26.25	2.0065	6 6 41.6	15.448	18	12 26 28.87	2.0707	6 36 11.4	15.862
19	10 51 26.62	2.0058	5 51 13.6	15.485	19	12 28 33.21	2.0742	6 52 2.4	15.838
20	10 53 26.95	2.0053	5 35 43.4	15.522	20	12 30 37.77	2.0778	7 7 52.0	15.814
21	10 55 27.25	2.0048	5 20 11.0	15.557	21	12 32 42.55	2.0815	7 23 40.1	15.788
22	10 57 27.52	2.0043	5 4 36.6	15.589	22	12 34 47.55	2.0853	7 39 26.6	15.761
23	10 59 27.77	2.0040	N. 4 49 0.3	15.622	23	12 36 52.79	2.0893	S. 7 55 11.4	15.732
WEDNESDAY 6.					FRIDAY 8.				
0	11 1 28.00	2.0038	N. 4 33 22.0	15.653	0	12 38 58.26	2.0932	S. 8 10 54.5	15.702
1	11 3 28.22	2.0036	4 17 41.9	15.683	1	12 41 3.97	2.0973	8 26 35.7	15.671
2	11 5 28.43	2.0034	4 2 0.0	15.712	2	12 43 9.93	2.1014	8 42 15.0	15.637
3	11 7 28.63	2.0034	3 46 16.5	15.739	3	12 45 16.14	2.1058	8 57 52.2	15.603
4	11 9 28.84	2.0035	3 30 31.3	15.766	4	12 47 22.62	2.1101	9 13 27.4	15.568
5	11 11 29.05	2.0036	3 14 44.6	15.792	5	12 49 29.35	2.1144	9 29 0.4	15.530
6	11 13 29.27	2.0039	2 58 56.3	15.816	6	12 51 36.35	2.1190	9 44 31.0	15.491
7	11 15 29.52	2.0043	2 43 6.7	15.838	7	12 53 43.63	2.1236	9 59 59.3	15.451
8	11 17 29.78	2.0046	2 27 15.7	15.860	8	12 55 51.18	2.1283	10 15 25.1	15.409
9	11 19 30.07	2.0051	2 11 23.5	15.881	9	12 57 59.02	2.1331	10 30 48.4	15.366
10	11 21 30.39	2.0057	1 55 30.0	15.901	10	13 0 7.15	2.1379	10 46 0.0	15.321
11	11 23 30.75	2.0063	1 39 35.4	15.918	11	13 2 15.57	2.1428	11 1 26.9	15.274
12	11 25 31.15	2.0071	1 23 39.8	15.935	12	13 4 24.29	2.1479	11 16 41.9	15.226
13	11 27 31.60	2.0078	1 7 43.2	15.951	13	13 6 33.32	2.1530	11 31 54.0	15.177
14	11 29 32.09	2.0088	0 51 45.7	15.966	14	13 8 42.65	2.1582	11 47 3.1	15.125
15	11 31 32.65	2.0098	0 35 47.3	15.980	15	13 10 52.30	2.1635	12 2 9.0	15.072
16	11 33 33.27	2.0108	0 19 48.1	15.992	16	13 13 2.27	2.1688	12 17 11.7	15.018
17	11 35 33.95	2.0120	0 3 48.3	16.002	17	13 15 12.56	2.1743	12 32 11.2	14.962
18	11 37 34.71	2.0133	S. 0 12 12.1	16.012	18	13 17 23.18	2.1798	12 47 7.2	14.904
19	11 39 35.55	2.0147	0 28 13.1	16.021	19	13 19 34.14	2.1854	13 1 59.7	14.845
20	11 41 36.47	2.0161	0 44 14.6	16.028	20	13 21 45.43	2.1911	13 16 48.6	14.784
21	11 43 37.48	2.0176	1 0 16.5	16.034	21	13 23 57.07	2.1968	13 31 33.8	14.722
22	11 45 38.58	2.0193	1 16 18.7	16.038	22	13 26 9.05	2.2027	13 46 15.2	14.657
23	11 47 39.79	2.0210	1 32 21.1	16.042	23	13 28 21.39	2.2086	14 0 52.7	14.592
24	11 49 41.10	2.0228	S. 1 48 23.7	16.044	24	13 30 34.08	2.2146	S. 14 15 26.2	14.524

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
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SATURDAY 9.					MONDAY 11.				
	h	m	s	"		h	m	s	"
0	13	30	34.08	2.2146	0	15	24	43.85	2.5501
1	13	32	47.14	2.2207	1	15	27	17.06	2.5570
2	13	35	0.56	2.2268	2	15	29	50.69	2.5638
3	13	37	14.35	2.2329	3	15	32	24.72	2.5705
4	13	39	28.51	2.2393	4	15	34	59.15	2.5772
5	13	41	43.06	2.2457	5	15	37	33.98	2.5838
6	13	43	57.99	2.2520	6	15	40	9.20	2.5902
7	13	46	13.30	2.2584	7	15	42	44.80	2.5966
8	13	48	29.00	2.2649	8	15	45	20.79	2.6029
9	13	50	45.09	2.2715	9	15	47	57.15	2.6091
10	13	53	1.58	2.2782	10	15	50	33.88	2.6153
11	13	55	18.47	2.2848	11	15	53	10.98	2.6213
12	13	57	35.76	2.2916	12	15	55	48.43	2.6271
13	13	59	53.46	2.2984	13	15	58	26.23	2.6329
14	14	2	11.57	2.3053	14	16	1	4.38	2.6387
15	14	4	30.09	2.3122	15	16	3	42.87	2.6443
16	14	6	49.03	2.3192	16	16	6	21.69	2.6497
17	14	9	8.39	2.3262	17	16	9	0.83	2.6549
18	14	11	28.17	2.3332	18	16	11	40.28	2.6601
19	14	13	48.37	2.3403	19	16	14	20.04	2.6651
20	14	16	9.00	2.3474	20	16	17	0.09	2.6699
21	14	18	30.06	2.3546	21	16	19	40.43	2.6748
22	14	20	51.55	2.3618	22	16	22	21.06	2.6794
23	14	23	13.47	2.3690	23	16	25	1.96	2.6838

SUNDAY 10.					TUESDAY 12.				
	h	m	s	"		h	m	s	"
0	14	25	35.83	2.3763	0	16	27	43.12	2.6882
1	14	27	58.62	2.3835	1	16	30	24.54	2.6923
2	14	30	21.85	2.3908	2	16	33	6.20	2.6963
3	14	32	45.52	2.3982	3	16	35	48.09	2.7000
4	14	35	9.63	2.4054	4	16	38	30.20	2.7037
5	14	37	34.17	2.4128	5	16	41	12.53	2.7072
6	14	39	59.16	2.4202	6	16	43	55.06	2.7104
7	14	42	24.59	2.4275	7	16	46	37.78	2.7135
8	14	44	50.46	2.4348	8	16	49	20.68	2.7164
9	14	47	16.77	2.4422	9	16	52	3.75	2.7193
10	14	49	43.52	2.4496	10	16	54	46.99	2.7221
11	14	52	10.72	2.4569	11	16	57	30.37	2.7247
12	14	54	38.35	2.4642	12	17	0	13.89	2.7273
13	14	57	6.42	2.4716	13	17	2	57.53	2.7283
14	14	59	34.94	2.4789	14	17	5	41.29	2.7302
15	15	2	3.89	2.4862	15	17	8	25.15	2.7318
16	15	4	33.28	2.4934	16	17	11	9.10	2.7331
17	15	7	3.10	2.5007	17	17	13	53.12	2.7343
18	15	9	33.36	2.5078	18	17	16	37.22	2.7353
19	15	12	4.04	2.5150	19	17	19	21.36	2.7361
20	15	14	35.16	2.5222	20	17	22	5.55	2.7368
21	15	17	6.70	2.5292	21	17	24	49.77	2.7371
22	15	19	38.66	2.5363	22	17	27	34.00	2.7373
23	15	22	11.05	2.5433	23	17	30	18.24	2.7373
24	15	24	43.85	2.5501	24	17	33	2.48	2.7372

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
WEDNESDAY 13.					FRIDAY 15.				
0	h m s	s	"	"	0	h m s	s	"	"
0	17 33 2.48	2.7372	S. 27 55 35.5	0.209	0	19 40 34.21	2.5163	S. 24 23 28.8	8.604
1	17 35 46.70	2.7367	27 55 41.9	-0.006	1	19 43 4.96	2.5086	24 14 48.1	8.754
2	17 38 30.88	2.7360	27 55 36.2	+0.197	2	19 45 35.24	2.5008	24 5 58.5	8.899
3	17 41 15.02	2.7352	27 55 18.3	0.400	3	19 48 5.06	2.4931	23 57 0.2	9.043
4	17 43 59.10	2.7341	27 54 48.2	0.602	4	19 50 34.41	2.4852	23 47 53.3	9.186
5	17 46 43.11	2.7328	27 54 6.0	0.805	5	19 53 3.28	2.4772	23 38 37.9	9.327
6	17 49 27.04	2.7314	27 53 11.6	1.007	6	19 55 31.67	2.4693	23 29 14.0	9.467
7	17 52 10.88	2.7298	27 52 5.1	1.208	7	19 57 59.59	2.4613	23 19 41.9	9.603
8	17 54 54.61	2.7279	27 50 46.6	1.409	8	20 0 27.02	2.4532	23 10 1.6	9.739
9	17 57 38.23	2.7258	27 49 16.0	1.611	9	20 2 53.97	2.4451	23 0 13.2	9.872
10	18 0 21.71	2.7236	27 47 33.3	1.811	10	20 5 20.43	2.4369	22 50 16.9	10.003
11	18 3 5.06	2.7212	27 45 38.7	2.010	11	20 7 46.40	2.4288	22 40 12.8	10.132
12	18 5 48.25	2.7184	27 43 32.1	2.210	12	20 10 11.88	2.4206	22 30 1.0	10.260
13	18 8 31.27	2.7156	27 41 13.5	2.408	13	20 12 36.87	2.4124	22 19 41.6	10.386
14	18 11 14.12	2.7126	27 38 43.1	2.606	14	20 15 1.37	2.4043	22 9 14.7	10.509
15	18 13 56.78	2.7093	27 36 0.8	2.802	15	20 17 25.38	2.3960	21 58 40.5	10.631
16	18 16 39.24	2.7059	27 33 6.8	2.998	16	20 19 48.89	2.3878	21 47 59.0	10.751
17	18 19 21.49	2.7023	27 30 1.0	3.194	17	20 22 11.91	2.3795	21 37 10.4	10.868
18	18 22 3.52	2.6986	27 26 43.5	3.388	18	20 24 34.43	2.3713	21 26 14.8	10.984
19	18 24 45.32	2.6946	27 23 14.4	3.581	19	20 26 56.46	2.3630	21 15 12.3	11.098
20	18 27 26.87	2.6904	27 19 33.8	3.773	20	20 29 17.99	2.3548	21 4 3.0	11.211
21	18 30 8.17	2.6861	27 15 41.6	3.965	21	20 31 39.03	2.3465	20 52 47.0	11.321
22	18 32 49.20	2.6816	27 11 38.0	4.155	22	20 33 59.57	2.3383	20 41 24.5	11.428
23	18 35 29.96	2.6770	S. 27 7 23.0	4.344	23	20 36 19.62	2.3301	S. 20 29 55.6	11.534
THURSDAY 14.					SATURDAY 16.				
0	h m s	s	"	"	0	h m s	s	"	"
0	18 38 10.44	2.6722	S. 27 2 56.7	4.532	0	20 38 39.18	2.3218	S. 20 18 20.4	11.638
1	18 40 50.62	2.6671	26 58 19.1	4.719	1	20 40 58.24	2.3137	20 6 39.0	11.741
2	18 43 30.49	2.6619	26 53 30.4	4.904	2	20 43 16.82	2.3056	19 54 51.5	11.841
3	18 46 10.05	2.6567	26 48 30.6	5.088	3	20 45 34.91	2.2974	19 42 58.1	11.939
4	18 48 49.29	2.6513	26 43 19.8	5.271	4	20 47 52.51	2.2893	19 30 58.8	12.037
5	18 51 28.20	2.6456	26 37 58.1	5.452	5	20 50 9.62	2.2812	19 18 53.7	12.131
6	18 54 6.76	2.6398	26 32 25.5	5.632	6	20 52 26.25	2.2732	19 6 43.1	12.223
7	18 56 44.98	2.6340	26 26 42.2	5.811	7	20 54 42.40	2.2652	18 54 26.9	12.314
8	18 59 22.84	2.6280	26 20 48.2	5.988	8	20 56 58.07	2.2572	18 42 5.4	12.403
9	19 2 0.34	2.6219	26 14 43.6	6.165	9	20 59 13.26	2.2492	18 29 38.5	12.491
10	19 4 37.47	2.6156	26 8 28.4	6.339	10	21 1 27.97	2.2413	18 17 6.5	12.576
11	19 7 14.21	2.6092	26 2 2.9	6.511	11	21 3 42.21	2.2334	18 4 29.4	12.659
12	19 9 50.57	2.6027	25 55 27.1	6.682	12	21 5 55.98	2.2256	17 51 47.4	12.741
13	19 12 26.53	2.5960	25 48 41.1	6.852	13	21 8 9.28	2.2178	17 39 0.5	12.821
14	19 15 2.09	2.5892	25 41 44.9	7.020	14	21 10 22.12	2.2102	17 26 8.9	12.898
15	19 17 37.23	2.5823	25 34 38.7	7.186	15	21 12 34.50	2.2025	17 13 12.7	12.975
16	19 20 11.96	2.5754	25 27 22.6	7.351	16	21 14 46.42	2.1948	17 0 11.9	13.050
17	19 22 46.28	2.5684	25 19 56.6	7.513	17	21 16 57.88	2.1873	16 47 6.7	13.122
18	19 25 20.17	2.5611	25 12 21.0	7.674	18	21 19 8.90	2.1798	16 33 57.3	13.192
19	19 27 53.61	2.5538	25 4 35.7	7.834	19	21 21 19.46	2.1723	16 20 43.6	13.262
20	19 30 26.63	2.5467	24 56 40.9	7.992	20	21 23 29.58	2.1649	16 7 25.8	13.331
21	19 32 59.21	2.5392	24 48 36.7	8.147	21	21 25 39.25	2.1576	15 54 3.9	13.397
22	19 35 31.33	2.5316	24 40 23.3	8.301	22	21 27 48.49	2.1504	15 40 38.2	13.460
23	19 38 3.00	2.5240	24 32 0.6	8.454	23	21 29 57.30	2.1432	15 27 8.7	13.522
24	19 40 34.21	2.5163	S. 24 23 28.8	8.604	24	21 32 5.67	2.1360	S. 15 13 35.5	13.583

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
SUNDAY 17.					TUESDAY 19.				
0	h m s	s	" "	" "	0	h m s	s	" "	" "
0	21 32 5.67	2.1360	S. 15 13 35.5	13.583	0	23 7 49.60	1.8841	S. 3 39 39.6	14.832
1	21 34 13.62	2.1290	14 59 58.7	13.642	1	23 9 42.55	1.8808	3 24 49.7	14.829
2	21 36 21.15	2.1220	14 46 18.4	13.700	2	23 11 35.30	1.8777	3 10 0.1	14.825
3	21 38 28.26	2.1150	14 32 34.7	13.756	3	23 13 27.87	1.8747	2 55 10.7	14.821
4	21 40 34.95	2.1081	14 18 47.7	13.810	4	23 15 20.26	1.8718	2 40 21.6	14.815
5	21 42 41.23	2.1013	14 4 57.5	13.862	5	23 17 12.48	1.8688	2 25 32.9	14.808
6	21 44 47.11	2.0946	13 51 4.2	13.913	6	23 19 4.52	1.8660	2 10 44.6	14.801
7	21 46 52.58	2.0879	13 37 7.9	13.963	7	23 20 56.40	1.8633	1 55 56.8	14.792
8	21 48 57.66	2.0814	13 23 8.6	14.012	8	23 22 48.12	1.8608	1 41 9.6	14.781
9	21 51 2.35	2.0749	13 9 6.5	14.058	9	23 24 39.60	1.8583	1 26 22.9	14.772
10	21 53 6.65	2.0684	12 55 1.6	14.103	10	23 26 31.11	1.8558	1 11 37.0	14.760
11	21 55 10.56	2.0620	12 40 54.1	14.147	11	23 28 22.38	1.8533	0 56 51.7	14.748
12	21 57 14.09	2.0558	12 26 44.1	14.188	12	23 30 13.51	1.8510	0 42 7.2	14.735
13	21 59 17.25	2.0496	12 12 31.6	14.228	13	23 32 4.50	1.8488	0 27 23.5	14.721
14	22 1 20.04	2.0434	11 58 16.7	14.267	14	23 33 55.37	1.8467	S. 0 12 40.7	14.707
15	22 3 22.46	2.0373	11 43 59.5	14.305	15	23 35 46.11	1.8447	N. 0 2 1.3	14.692
16	22 5 24.52	2.0314	11 29 40.1	14.341	16	23 37 36.73	1.8427	0 16 42.3	14.674
17	22 7 26.23	2.0255	11 15 18.6	14.376	17	23 39 27.23	1.8408	0 31 22.2	14.657
18	22 9 27.58	2.0197	11 0 55.0	14.410	18	23 41 17.62	1.8390	0 46 1.1	14.639
19	22 11 28.59	2.0140	10 46 29.4	14.442	19	23 43 7.91	1.8373	1 0 38.9	14.620
20	22 13 29.26	2.0083	10 32 2.0	14.472	20	23 44 58.10	1.8357	1 15 15.5	14.601
21	22 15 29.59	2.0028	10 17 32.8	14.501	21	23 46 48.19	1.8341	1 29 51.0	14.580
22	22 17 29.59	1.9973	10 3 1.9	14.529	22	23 48 38.19	1.8326	1 44 25.1	14.558
23	22 19 29.26	1.9918	S. 9 48 29.3	14.556	23	23 50 28.10	1.8312	N. 1 58 58.0	14.537
MONDAY 18.					WEDNESDAY 20.				
0	22 21 28.61	1.9866	S. 9 33 55.2	14.581	0	23 52 17.93	1.8299	N. 2 13 29.5	14.513
1	22 23 27.65	1.9813	9 19 19.6	14.605	1	23 54 7.69	1.8287	2 27 59.6	14.490
2	22 25 26.37	1.9761	9 4 42.6	14.627	2	23 55 57.37	1.8275	2 42 28.3	14.465
3	22 27 24.78	1.9711	8 50 4.3	14.648	3	23 57 46.99	1.8264	2 56 55.4	14.440
4	22 29 22.90	1.9661	8 35 24.8	14.669	4	23 59 36.54	1.8253	3 11 21.1	14.415
5	22 31 20.71	1.9612	8 20 44.0	14.688	5	0 1 26.03	1.8244	3 25 45.2	14.387
6	22 33 18.24	1.9564	8 6 2.2	14.706	6	0 3 15.47	1.8236	3 40 7.6	14.360
7	22 35 15.48	1.9517	7 51 19.3	14.722	7	0 5 4.86	1.8228	3 54 28.4	14.332
8	22 37 12.44	1.9470	7 36 35.5	14.737	8	0 6 54.21	1.8222	4 8 47.5	14.303
9	22 39 9.12	1.9424	7 21 50.8	14.752	9	0 8 43.52	1.8215	4 23 4.8	14.273
10	22 41 5.53	1.9379	7 7 5.3	14.765	10	0 10 32.79	1.8210	4 37 20.3	14.243
11	22 43 1.67	1.9335	6 52 19.0	14.777	11	0 12 22.04	1.8206	4 51 34.0	14.212
12	22 44 57.55	1.9292	6 37 32.0	14.788	12	0 14 11.26	1.8202	5 5 45.7	14.179
13	22 46 53.17	1.9250	6 22 44.4	14.797	13	0 16 0.46	1.8198	5 19 55.5	14.147
14	22 48 48.55	1.9209	6 7 56.3	14.806	14	0 17 49.64	1.8197	5 34 3.4	14.114
15	22 50 43.68	1.9168	5 53 7.7	14.812	15	0 19 38.82	1.8196	5 48 9.2	14.080
16	22 52 38.57	1.9128	5 38 18.8	14.819	16	0 21 27.99	1.8194	6 2 13.0	14.046
17	22 54 33.22	1.9089	5 23 29.4	14.825	17	0 23 17.15	1.8194	6 16 14.7	14.011
18	22 56 27.64	1.9051	5 8 39.8	14.828	18	0 25 6.32	1.8195	6 30 14.3	13.975
19	22 58 21.83	1.9014	4 53 50.0	14.832	19	0 26 55.49	1.8196	6 44 11.7	13.937
20	23 0 15.81	1.8978	4 39 0.0	14.834	20	0 28 44.67	1.8198	6 58 6.8	13.900
21	23 2 9.57	1.8943	4 24 9.9	14.835	21	0 30 33.87	1.8202	7 11 59.7	13.862
22	23 4 3.12	1.8908	4 9 19.8	14.836	22	0 32 23.09	1.8205	7 25 50.3	13.823
23	23 5 56.46	1.8873	3 54 29.6	14.835	23	0 34 12.33	1.8210	7 39 38.5	13.783
24	23 7 49.60	1.8841	S. 3 39 39.6	14.832	24	0 36 1.61	1.8216	N. 7 53 24.3	13.743

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
THURSDAY 21.					SATURDAY 23.				
0	h m s	s	° ' "	"	0	h m s	s	° ' "	"
0	36 1.61	1.8216	N. 7 53 24.3	13.743	0	2 5 21.36	1.9248	N. 17 54 4.7	11.022
1	37 50.92	1.8221	8 7 7.7	13.702	1	2 7 16.95	1.9283	18 5 3.8	10.948
2	39 40.26	1.8228	8 20 48.6	13.661	2	2 9 12.76	1.9320	18 15 58.5	10.874
3	41 29.65	1.8235	8 34 27.0	13.619	3	2 11 8.79	1.9356	18 26 48.7	10.799
4	43 19.08	1.8243	8 48 2.9	13.577	4	2 13 5.03	1.9393	18 37 34.4	10.723
5	45 8.57	1.8253	9 1 36.2	13.533	5	2 15 1.50	1.9431	18 48 15.5	10.647
6	46 58.11	1.8261	9 15 6.0	13.489	6	2 16 58.20	1.9469	18 58 52.0	10.569
7	48 47.70	1.8271	9 28 34.9	13.444	7	2 18 55.13	1.9508	19 9 23.8	10.491
8	50 37.36	1.8283	9 42 0.2	13.398	8	2 20 52.29	1.9547	19 19 50.9	10.412
9	52 27.09	1.8294	9 55 22.7	13.352	9	2 22 49.69	1.9586	19 30 13.2	10.332
10	54 16.89	1.8307	10 8 42.4	13.305	10	2 24 47.32	1.9625	19 40 30.7	10.251
11	56 6.77	1.8319	10 21 59.3	13.257	11	2 26 45.19	1.9666	19 50 43.3	10.169
12	57 56.72	1.8333	10 35 13.3	13.209	12	2 28 43.31	1.9707	20 0 51.0	10.087
13	59 46.76	1.8348	10 48 24.4	13.160	13	2 30 41.67	1.9747	20 10 53.8	10.005
14	1 36.89	1.8363	11 1 32.5	13.111	14	2 32 40.27	1.9788	20 20 51.6	9.921
15	1 37.11	1.8378	11 14 37.7	13.062	15	2 34 39.13	1.9830	20 30 44.3	9.837
16	1 5 17.43	1.8395	11 27 39.9	13.010	16	2 36 38.23	1.9872	20 40 32.0	9.752
17	1 7 7.85	1.8412	11 40 38.9	12.958	17	2 38 37.59	1.9915	20 50 14.5	9.665
18	1 8 58.37	1.8430	11 53 34.9	12.907	18	2 40 37.21	1.9958	20 59 51.8	9.578
19	1 10 49.01	1.8448	12 6 27.7	12.853	19	2 42 37.08	2.0000	21 9 23.9	9.492
20	1 12 39.75	1.8467	12 19 17.3	12.800	20	2 44 37.21	2.0043	21 18 50.8	9.403
21	1 14 30.61	1.8487	12 32 3.7	12.746	21	2 46 37.60	2.0087	21 28 12.3	9.313
22	1 16 21.59	1.8507	12 44 46.8	12.691	22	2 48 38.25	2.0130	21 37 28.4	9.223
23	1 18 12.69	1.8528	N. 12 57 26.6	12.635	23	2 50 39.16	2.0174	N. 21 46 39.1	9.132
FRIDAY 22.					SUNDAY 24.				
0	1 20 3.92	1.8549	N. 13 10 3.0	12.579	0	2 52 40.34	2.0219	N. 21 55 44.3	9.041
1	1 21 55.28	1.8572	13 22 36.1	12.522	1	2 54 41.79	2.0263	22 4 44.0	8.948
2	1 23 46.78	1.8595	13 35 5.7	12.464	2	2 56 43.50	2.0308	22 13 38.1	8.855
3	1 25 38.42	1.8618	13 47 31.8	12.406	3	2 58 45.49	2.0353	22 22 26.6	8.762
4	1 27 30.20	1.8643	13 59 54.4	12.347	4	3 0 47.74	2.0398	22 31 9.5	8.667
5	1 29 22.13	1.8668	14 12 13.5	12.287	5	3 2 50.27	2.0444	22 39 46.6	8.571
6	1 31 14.21	1.8693	14 24 28.9	12.227	6	3 4 53.07	2.0489	22 48 18.0	8.474
7	1 33 6.44	1.8718	14 36 40.7	12.167	7	3 6 56.14	2.0535	22 56 43.5	8.377
8	1 34 58.83	1.8746	14 48 48.9	12.105	8	3 8 59.49	2.0582	23 5 3.2	8.279
9	1 36 51.39	1.8773	15 0 53.3	12.042	9	3 11 3.12	2.0628	23 13 17.0	8.180
10	1 38 44.10	1.8800	15 12 54.0	11.980	10	3 13 7.02	2.0673	23 21 24.8	8.080
11	1 40 36.99	1.8829	15 24 50.9	11.916	11	3 15 11.20	2.0719	23 29 26.6	7.979
12	1 42 30.05	1.8858	15 36 43.9	11.851	12	3 17 15.65	2.0766	23 37 22.3	7.877
13	1 44 23.28	1.8887	15 48 33.0	11.786	13	3 19 20.39	2.0813	23 45 11.9	7.776
14	1 46 16.69	1.8918	16 0 18.2	11.720	14	3 21 25.40	2.0858	23 52 55.4	7.672
15	1 48 10.29	1.8948	16 11 59.4	11.653	15	3 23 30.69	2.0905	24 0 32.6	7.568
16	1 50 4.07	1.8978	16 23 36.6	11.586	16	3 25 36.26	2.0951	24 8 3.6	7.463
17	1 51 58.03	1.9010	16 35 9.7	11.518	17	3 27 42.10	2.0998	24 15 28.2	7.357
18	1 53 52.19	1.9043	16 46 38.8	11.450	18	3 29 48.23	2.1045	24 22 46.5	7.252
19	1 55 46.55	1.9076	16 58 3.7	11.380	19	3 31 54.64	2.1091	24 29 58.4	7.144
20	1 57 41.10	1.9109	17 9 24.4	11.310	20	3 34 1.32	2.1137	24 37 3.8	7.036
21	1 59 35.86	1.9143	17 20 40.9	11.240	21	3 36 8.28	2.1183	24 44 2.7	6.927
22	2 1 30.81	1.9177	17 31 53.2	11.168	22	3 38 15.52	2.1230	24 50 55.1	6.817
23	2 3 25.98	1.9213	17 43 1.1	11.096	23	3 40 23.04	2.1276	24 57 40.8	6.707
24	2 5 21.36	1.9248	N. 17 54 4.7	11.022	24	3 42 30.83	2.1322	N. 25 4 19.9	6.595

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
MONDAY 25.					WEDNESDAY 27.				
	h m s	s	"	"		h m s	s	"	"
0	3 42 30.83	2.1322	N. 25 4 19.9	6.595	0	5 29 33.10	2.3073	N. 27 57 43.5	0.367
1	3 44 38.90	2.1368	25 10 52.2	6.482	1	5 31 51.60	2.3093	27 58 1.2	0.222
2	3 46 47.25	2.1414	25 17 17.8	6.370	2	5 34 10.21	2.3112	27 58 10.2	+0.078
3	3 48 55.87	2.1459	25 23 36.6	6.256	3	5 36 28.94	2.3130	27 58 10.6	-0.067
4	3 51 4.76	2.1505	25 29 48.5	6.141	4	5 38 47.77	2.3148	27 58 2.2	0.212
5	3 53 13.93	2.1551	25 35 53.5	6.025	5	5 41 6.71	2.3165	27 57 45.1	0.358
6	3 55 23.37	2.1595	25 41 51.5	5.908	6	5 43 25.75	2.3181	27 57 19.2	0.504
7	3 57 33.07	2.1640	25 47 42.5	5.792	7	5 45 44.88	2.3196	27 56 44.6	0.650
8	3 59 43.05	2.1685	25 53 26.5	5.673	8	5 48 4.10	2.3210	27 56 1.2	0.797
9	4 1 53.29	2.1729	25 59 3.3	5.555	9	5 50 23.40	2.3223	27 55 9.0	0.944
10	4 4 3.80	2.1773	26 4 33.1	5.436	10	5 52 42.78	2.3235	27 54 7.9	1.092
11	4 6 14.57	2.1817	26 9 55.6	5.314	11	5 55 2.22	2.3246	27 52 58.0	1.238
12	4 8 25.60	2.1861	26 15 10.8	5.193	12	5 57 21.73	2.3257	27 51 39.3	1.386
13	4 10 36.90	2.1904	26 20 18.8	5.072	13	5 59 41.30	2.3266	27 50 11.7	1.534
14	4 12 48.45	2.1947	26 25 19.4	4.948	14	6 2 0.92	2.3274	27 48 35.2	1.682
15	4 15 0.26	2.1989	26 30 12.6	4.825	15	6 4 20.59	2.3282	27 46 49.9	1.829
16	4 17 12.32	2.2031	26 34 58.4	4.701	16	6 6 40.30	2.3289	27 44 55.7	1.977
17	4 19 24.63	2.2073	26 39 36.7	4.576	17	6 9 0.06	2.3295	27 42 52.6	2.126
18	4 21 37.19	2.2114	26 44 7.5	4.450	18	6 11 19.84	2.3298	27 40 40.6	2.274
19	4 23 50.00	2.2155	26 48 30.7	4.322	19	6 13 39.64	2.3303	27 38 19.7	2.422
20	4 26 3.05	2.2195	26 52 46.2	4.195	20	6 15 59.47	2.3306	27 35 50.0	2.570
21	4 28 16.34	2.2234	26 56 54.1	4.067	21	6 18 19.31	2.3308	27 33 11.3	2.719
22	4 30 29.86	2.2273	27 0 54.3	3.938	22	6 20 39.17	2.3309	27 30 23.7	2.867
23	4 32 43.62	2.2313	N. 27 4 46.7	3.809	23	6 22 59.02	2.3308	N. 27 27 27.2	3.016
TUESDAY 26.					THURSDAY 28.				
0	4 34 57.61	2.2351	N. 27 8 31.4	3.679	0	6 25 18.87	2.3308	N. 27 24 21.8	3.164
1	4 37 11.83	2.2388	27 12 8.2	3.547	1	6 27 38.71	2.3306	27 21 7.5	3.312
2	4 39 26.27	2.2426	27 15 37.1	3.416	2	6 29 58.54	2.3303	27 17 44.3	3.460
3	4 41 40.94	2.2463	27 18 58.1	3.284	3	6 32 18.35	2.3300	27 14 12.3	3.607
4	4 43 55.83	2.2499	27 22 11.2	3.151	4	6 34 38.14	2.3296	27 10 31.4	3.756
5	4 46 10.93	2.2534	27 25 16.2	3.017	5	6 36 57.90	2.3290	27 6 41.6	3.904
6	4 48 26.24	2.2568	27 28 13.2	2.882	6	6 39 17.62	2.3283	27 2 42.9	4.052
7	4 50 41.75	2.2603	27 31 2.1	2.747	7	6 41 37.30	2.3276	26 58 35.4	4.199
8	4 52 57.48	2.2638	27 33 42.9	2.612	8	6 43 56.93	2.3268	26 54 19.0	4.347
9	4 55 13.40	2.2669	27 36 15.6	2.477	9	6 46 16.52	2.3259	26 49 53.8	4.493
10	4 57 29.51	2.2701	27 38 40.1	2.339	10	6 48 36.04	2.3249	26 45 19.8	4.640
11	4 59 45.81	2.2733	27 40 56.3	2.201	11	6 50 55.51	2.3239	26 40 37.0	4.787
12	5 2 2.30	2.2764	27 43 4.2	2.063	12	6 53 14.91	2.3228	26 35 45.4	4.933
13	5 4 18.98	2.2794	27 45 3.9	1.925	13	6 55 34.24	2.3215	26 30 45.0	5.079
14	5 6 35.83	2.2823	27 46 55.2	1.786	14	6 57 53.49	2.3202	26 25 35.9	5.224
15	5 8 52.85	2.2852	27 48 38.2	1.646	15	7 0 12.66	2.3188	26 20 18.1	5.369
16	5 11 10.05	2.2880	27 50 12.7	1.506	16	7 2 31.74	2.3173	26 14 51.6	5.514
17	5 13 27.41	2.2907	27 51 38.9	1.366	17	7 4 50.74	2.3158	26 9 16.4	5.659
18	5 15 44.93	2.2933	27 52 56.6	1.224	18	7 7 9.64	2.3141	26 3 32.5	5.803
19	5 18 2.60	2.2958	27 54 5.8	1.082	19	7 9 28.43	2.3124	25 57 40.0	5.947
20	5 20 20.42	2.2982	27 55 6.5	0.941	20	7 11 47.13	2.3107	25 51 38.9	6.090
21	5 22 38.38	2.3006	27 55 58.6	0.797	21	7 14 5.72	2.3088	25 45 29.2	6.232
22	5 24 56.49	2.3029	27 56 42.2	0.655	22	7 16 24.19	2.3069	25 39 11.0	6.375
23	5 27 14.73	2.3051	27 57 17.2	0.511	23	7 18 42.55	2.3049	25 32 44.2	6.517
24	5 29 33.10	2.3073	N. 27 57 43.5	0.367	24	7 21 0.78	2.3028	N. 25 26 9.0	6.657

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
FRIDAY 29.					SUNDAY 31.				
0	h m s	s	° ' "	"	0	h m s	s	° ' "	"
0	7 21 0.78	2.3028	N. 25 26 9.0	6.657	0	9 8 17.80	2.1580	N. 17 37 37.8	12.517
1	7 23 18.89	2.3008	25 19 25.3	6.798	1	9 10 27.18	2.1548	17 25 3.8	12.615
2	7 25 36.87	2.2986	25 12 33.2	6.938	2	9 12 36.37	2.1515	17 12 24.0	12.712
3	7 27 54.72	2.2963	25 5 32.7	7.078	3	9 14 45.36	2.1483	16 59 38.4	12.807
4	7 30 12.43	2.2940	24 58 23.8	7.217	4	9 16 54.17	2.1452	16 46 47.1	12.902
5	7 32 30.00	2.2916	24 51 6.6	7.356	5	9 19 2.78	2.1420	16 33 50.2	12.994
6	7 34 47.42	2.2892	24 43 41.1	7.493	6	9 21 11.21	2.1389	16 20 47.8	13.086
7	7 37 4.70	2.2868	24 36 7.4	7.630	7	9 23 19.45	2.1358	16 7 39.9	13.177
8	7 39 21.83	2.2842	24 28 25.5	7.767	8	9 25 27.50	2.1328	15 54 26.6	13.266
9	7 41 38.80	2.2815	24 20 35.4	7.902	9	9 27 35.38	2.1298	15 41 8.0	13.354
10	7 43 55.61	2.2789	24 12 37.2	8.037	10	9 29 43.07	2.1267	15 27 44.1	13.442
11	7 46 12.27	2.2763	24 4 30.9	8.172	11	9 31 50.58	2.1237	15 14 15.0	13.527
12	7 48 28.76	2.2735	23 56 16.5	8.307	12	9 33 57.91	2.1208	15 0 40.8	13.612
13	7 50 45.09	2.2707	23 47 54.1	8.439	13	9 36 5.07	2.1179	14 47 1.6	13.695
14	7 53 1.24	2.2678	23 39 23.8	8.571	14	9 38 12.06	2.1150	14 33 17.4	13.777
15	7 55 17.22	2.2649	23 30 45.6	8.702	15	9 40 18.87	2.1122	14 19 28.3	13.858
16	7 57 33.03	2.2620	23 21 59.5	8.833	16	9 42 25.52	2.1094	14 5 34.4	13.937
17	7 59 48.66	2.2590	23 13 5.6	8.963	17	9 44 32.00	2.1066	13 51 35.8	14.016
18	8 2 4.11	2.2561	23 4 3.9	9.092	18	9 46 38.31	2.1039	13 37 32.5	14.093
19	8 4 19.39	2.2531	22 54 54.5	9.220	19	9 48 44.47	2.1013	13 23 24.6	14.169
20	8 6 34.48	2.2499	22 45 37.5	9.347	20	9 50 50.47	2.0987	13 9 12.2	14.243
21	8 8 49.38	2.2468	22 36 12.8	9.474	21	9 52 56.31	2.0961	12 54 55.4	14.317
22	8 11 4.10	2.2438	22 26 40.6	9.599	22	9 55 2.00	2.0936	12 40 34.2	14.389
23	8 13 18.63	2.2406	N. 22 17 0.9	9.724	23	9 57 7.54	2.0911	N. 12 26 8.7	14.460
SATURDAY 30.					MONDAY, FEBRUARY 1.				
0	8 15 32.97	2.2374	N. 22 7 13.7	9.848	0	9 59 12.93	2.0887	N. 12 11 39.0	14.529
1	8 17 47.12	2.2342	21 57 19.1	9.971	PHASES OF THE MOON.				
2	8 20 1.07	2.2309	21 47 17.2	10.092					
3	8 22 14.83	2.2277	21 37 8.0	10.213					
4	8 24 28.39	2.2244	21 26 51.6	10.333					
5	8 26 41.76	2.2212	21 16 28.0	10.452	☉ Full Moon Jan. 1 0 20.5 ☾ Last Quarter 8 9 12.6 ● New Moon 15 2 41.9 ☽ First Quarter 22 17 32.3 ○ Full Moon 30 16 41.3				
6	8 28 54.93	2.2179	21 5 57.3	10.571					
7	8 31 7.91	2.2146	20 55 19.5	10.688					
8	8 33 20.68	2.2112	20 44 34.7	10.804					
9	8 35 33.25	2.2078	20 33 43.0	10.919	☾ Perigee Jan. 12 2.1 ☾ Apogee 23 20.7				
10	8 37 45.62	2.2046	20 22 44.4	11.033					
11	8 39 57.80	2.2013	20 11 39.0	11.146					
12	8 42 9.77	2.1978	20 0 26.9	11.258					
13	8 44 21.54	2.1945	19 49 8.0	11.369					
14	8 46 33.11	2.1911	19 37 42.6	11.478					
15	8 48 44.47	2.1878	19 26 10.6	11.587					
16	8 50 55.64	2.1845	19 14 32.1	11.696					
17	8 53 6.61	2.1811	19 2 47.1	11.802					
18	8 55 17.37	2.1778	18 50 55.8	11.907					
19	8 57 27.94	2.1745	18 38 58.2	12.012					
20	8 59 38.31	2.1712	18 26 54.3	12.116					
21	9 1 48.48	2.1678	18 14 44.3	12.218					
22	9 3 58.45	2.1645	18 2 28.1	12.320					
23	9 6 8.22	2.1613	17 50 5.9	12.429					
24	9 8 17.80	2.1580	N. 17 37 37.8	12.517					

AT GREENWICH APPARENT NOON.

Day of the Week.	Day of the Month.	THE SUN'S					Sidereal Time of Semidiameter Passing Meridian.	Equation of Time, to be Added to Apparent Time.	Diff. for 1 Hour.
		Apparent Right Ascension.	Diff. for 1 Hour.	Apparent Declination.	Diff. for 1 Hour.	Semidiameter.			
		h m s	s	° ' "	"	' "	s	m s	s
Mon.	1	20 56 7.44	10.214	S.17 19 22.7	+42.09	16 15.76	68.33	13 38.69	0.357
Tues.	2	21 0 12.17	10.180	17 2 23.3	42.85	16 15.61	68.22	13 46.84	0.323
Wed.	3	21 4 16.08	10.146	16 45 5.9	43.59	16 15.46	68.10	13 54.18	0.289
Thur.	4	21 8 19.19	10.113	16 27 31.0	+44.31	16 15.30	67.99	14 0.71	0.256
Fri.	5	21 12 21.49	10.079	16 9 38.8	45.02	16 15.14	67.87	14 6.44	0.223
Sat.	6	21 16 22.99	10.046	15 51 29.9	45.72	16 14.97	67.75	14 11.37	0.190
SUN.	7	21 20 23.71	10.013	15 33 4.5	+46.40	16 14.80	67.64	14 15.52	0.157
Mon.	8	21 24 23.64	9.981	15 14 23.1	47.05	16 14.62	67.52	14 18.88	0.124
Tues.	9	21 28 22.78	9.948	14 55 26.1	47.69	16 14.44	67.41	14 21.46	0.092
Wed.	10	21 32 21.14	9.916	14 36 14.0	+48.31	16 14.26	67.30	14 23.26	0.060
Thur.	11	21 36 18.74	9.884	14 16 47.1	48.91	16 14.07	67.19	14 24.30	0.028
Fri.	12	21 40 15.56	9.852	13 57 5.9	49.50	16 13.88	67.08	14 24.57	0.004
Sat.	13	21 44 11.63	9.820	13 37 10.9	+50.07	16 13.69	66.97	14 24.08	0.036
SUN.	14	21 48 6.94	9.789	13 17 2.4	50.62	16 13.50	66.86	14 22.84	0.067
Mon.	15	21 52 1.50	9.758	12 56 41.0	51.15	16 13.31	66.76	14 20.84	0.098
Tues.	16	21 55 55.31	9.727	12 36 7.1	+51.66	16 13.12	66.65	14 18.11	0.129
Wed.	17	21 59 48.39	9.697	12 15 21.1	52.16	16 12.92	66.55	14 14.64	0.159
Thur.	18	22 3 40.74	9.667	11 54 23.5	52.64	16 12.71	66.45	14 10.46	0.189
Fri.	19	22 7 32.38	9.637	11 33 14.6	+53.10	16 12.50	66.35	14 5.55	0.218
Sat.	20	22 11 23.33	9.608	11 11 55.0	53.54	16 12.29	66.25	13 59.96	0.247
SUN.	21	22 15 13.58	9.580	10 50 25.0	53.96	16 12.08	66.15	13 53.67	0.275
Mon.	22	22 19 3.16	9.552	10 28 45.1	+54.36	16 11.87	66.06	13 46.72	0.303
Tues.	23	22 22 52.08	9.525	10 6 55.7	54.75	16 11.66	65.97	13 39.10	0.330
Wed.	24	22 26 40.36	9.499	9 44 57.1	55.12	16 11.44	65.88	13 30.85	0.356
Thur.	25	22 30 28.01	9.473	9 22 49.8	+55.48	16 11.21	65.79	13 21.98	0.382
Fri.	26	22 34 15.06	9.448	9 0 34.2	55.82	16 10.99	65.71	13 12.49	0.407
Sat.	27	22 38 1.52	9.424	8 38 10.7	56.14	16 10.76	65.63	13 2.42	0.431
SUN.	28	22 41 47.40	9.401	8 15 39.5	56.45	16 10.53	65.55	12 51.79	0.454
Mon.	29	22 45 32.75	9.379	S. 7 53 1.2	+56.74	16 10.29	65.47	12 40.60	0.476

NOTE.—The mean time of semidiameter passing the meridian may be found by subtracting 0.19 from the sidereal time.

The sign + prefixed to the hourly change of declination indicates that south declinations are decreasing.

AT GREENWICH MEAN NOON.

Day of the Week.	Day of the Month.	THE SUN'S				Equation of Time, to be Subtracted from Mean Time.	Diff. for 1 Hour.	Sidereal Time, or Right Ascension of Mean Sun.
		Apparent Right Ascension.	Diff. for 1 Hour.	Apparent Declination.	Diff. for 1 Hour.			
		h m s	s	° ' "	"	m s	s	h m s
on.	1	20 56 5.12	10.213	S. 17 19 32.2	+42.08	13 38.61	0.357	20 42 26.51
ues.	2	21 0 9.83	10.179	17 2 33.1	42.84	13 46.76	0.323	20 46 23.07
'ed.	3	21 4 13.73	10.146	16 45 16.0	43.58	13 54.11	0.289	20 50 19.62
hur.	4	21 8 16.83	10.112	16 27 41.3	+44.30	14 0.65	0.256	20 54 16.18
ri.	5	21 12 19.12	10.079	16 9 49.4	45.01	14 6.38	0.223	20 58 12.74
it.	6	21 16 20.62	10.046	15 51 40.7	45.70	14 11.32	0.190	21 2 9.29
UN	7	21 20 21.33	10.013	15 33 15.5	+46.38	14 15.48	0.157	21 6 5.85
on.	8	21 24 21.25	9.981	15 14 34.3	47.04	14 18.85	0.124	21 10 2.40
ues.	9	21 28 20.40	9.948	14 55 37.5	47.68	14 21.44	0.092	21 13 58.96
'ed.	10	21 32 18.76	9.916	14 36 25.6	+48.30	14 23.25	0.060	21 17 55.52
hur.	11	21 36 16.36	9.884	14 16 58.8	48.91	14 24.29	0.028	21 21 52.07
ri.	12	21 40 13.20	9.852	13 57 17.8	49.50	14 24.57	0.004	21 25 48.63
it.	13	21 44 9.27	9.821	13 37 22.9	+50.07	14 24.09	0.036	21 29 45.18
UN.	14	21 48 4.59	9.789	13 17 14.5	50.62	14 22.85	0.067	21 33 41.74
on.	15	21 51 59.16	9.758	12 56 53.2	51.15	14 20.87	0.098	21 37 38.29
ues.	16	21 55 52.99	9.728	12 36 19.4	+51.66	14 18.14	0.129	21 41 34.85
'ed.	17	21 59 46.09	9.697	12 15 33.5	52.16	14 14.68	0.159	21 45 31.40
hur.	18	22 3 38.46	9.667	11 54 35.9	52.63	14 10.50	0.189	21 49 27.96
ri.	19	22 7 30.12	9.638	11 33 27.1	+53.09	14 5.61	0.218	21 53 24.51
it.	20	22 11 21.08	9.609	11 12 7.5	53.54	14 0.02	0.247	21 57 21.07
UN.	21	22 15 11.36	9.581	10 50 37.5	53.96	13 53.74	0.275	22 1 17.62
on.	22	22 19 0.96	9.553	10 28 57.6	+54.36	13 46.79	0.303	22 5 14.18
ues.	23	22 22 49.91	9.526	10 7 8.1	54.75	13 39.18	0.330	22 9 10.73
'ed.	24	22 26 38.22	9.500	9 45 9.5	55.12	13 30.93	0.356	22 13 7.29
hur.	25	22 30 25.90	9.474	9 23 2.2	+55.48	13 22.06	0.382	22 17 3.84
ri.	26	22 34 12.98	9.449	9 0 46.5	55.82	13 12.58	0.407	22 21 0.40
it.	27	22 37 59.47	9.425	8 38 22.9	56.14	13 2.52	0.431	22 24 56.95
UN.	28	22 41 45.39	9.402	8 15 51.6	56.45	12 51.88	0.454	22 28 53.50
on.	29	22 45 30.76	9.380	S. 7 53 13.2	+56.74	12 40.70	0.476	22 32 50.06

NOTE.—The semidiameter for mean noon may be assumed the same as that for apparent noon.
The sign + prefixed to the hourly change of declination indicates that south declinations are decreasing.

Diff. for 1 Hour,
+9^h.8565.
(Table III.)

AT GREENWICH MEAN NOON.

Day of the Month.	Day of the Year.	THE SUN'S						Logarithm of the Radius Vector of the Earth.	Diff. for 1 Hour.	Mean Time Sidereal		
		True Longitude.				Diff. for 1 Hour.	Latitude.					
		λ		λ'								
		°	'	"	'	"	"	"		h	m	
1	32	311	33	54.5	33	39.8	152.18	+0.03	9.993 6068	+26.8	3	17
2	33	312	34	46.4	34	31.5	152.14	-0.09	9.993 6723	27.8	3	13
3	34	313	35	37.3	35	22.3	152.10	0.22	9.993 7403	28.8	3	9
4	35	314	36	27.3	36	12.1	152.06	-0.33	9.993 8107	+29.8	3	5
5	36	315	37	16.3	37	1.0	152.03	0.42	9.993 8834	30.7	3	1
6	37	316	38	4.5	37	49.0	151.99	0.49	9.993 9581	31.5	2	57
7	38	317	38	51.8	38	36.2	151.95	-0.52	9.994 0348	+32.3	2	53
8	39	318	39	38.1	39	22.3	151.91	0.51	9.994 1132	33.0	2	49
9	40	319	40	23.4	40	7.5	151.87	0.48	9.994 1933	33.6	2	45
10	41	320	41	7.7	40	51.6	151.82	-0.41	9.994 2747	+34.2	2	41
11	42	321	41	50.9	41	34.7	151.77	0.31	9.994 3575	34.7	2	37
12	43	322	42	32.9	42	16.5	151.72	0.20	9.994 4414	35.2	2	33
13	44	323	43	13.6	42	57.1	151.66	-0.07	9.994 5264	+35.6	2	29
14	45	324	43	52.9	43	36.3	151.60	+0.08	9.994 6125	36.1	2	25
15	46	325	44	30.8	44	14.0	151.54	0.21	9.994 6995	36.5	2	21
16	47	326	45	7.1	44	50.2	151.48	+0.34	9.994 7876	+36.9	2	18
17	48	327	45	41.8	45	24.7	151.41	0.45	9.994 8766	37.4	2	14
18	49	328	46	14.7	45	57.5	151.34	0.55	9.994 9668	37.8	2	10
19	50	329	46	45.9	46	28.6	151.26	+0.63	9.995 0582	+38.3	2	6
20	51	330	47	15.3	46	57.8	151.19	0.67	9.995 1507	38.8	2	2
21	52	331	47	42.8	47	25.2	151.11	0.69	9.995 2446	39.4	1	58
22	53	332	48	8.4	47	50.7	151.03	+0.67	9.995 3398	+40.0	1	54
23	54	333	48	32.1	48	14.3	150.95	0.63	9.995 4363	40.6	1	50
24	55	334	48	53.9	48	36.0	150.87	0.56	9.995 5344	41.2	1	46
25	56	335	49	13.8	48	55.7	150.79	+0.47	9.995 6340	+41.8	1	42
26	57	336	49	31.7	49	13.5	150.72	0.36	9.995 7353	42.5	1	38
27	58	337	49	47.7	49	29.4	150.64	0.23	9.995 8382	43.2	1	34
28	59	338	50	1.8	49	43.4	150.56	+0.10	9.995 9429	44.0	1	30
29	60	339	50	14.0	49	55.5	150.48	-0.03	9.996 0493	+44.8	1	26

NOTE.—The longitudes in the column λ are referred to the true equinox of their own date, while those in the column λ' are referred to the mean equinox of the beginning of the Besselian fictitious year.

Diff. for
—9^h.
(Tabl

GREENWICH MEAN TIME.

Day of the Month.	THE MOON'S								
	SEMIDIAMETER.		HORIZONTAL PARALLAX.				UPPER TRANSIT.		AGE.
	Noon.	Midnight.	Noon.	Diff. for 1 Hour.	Midnight.	Diff. for 1 Hour.	Meridian of Greenwich.	Diff. for 1 Hour.	Noon.
	' "	' "	' "	"	' "	"	h m	m	d
1	15 46.0	15 49.9	57 45.91	+1.250	58 0.31	+1.149	13 43.0	1.95	16.9
2	15 53.5	15 56.7	58 13.45	1.040	58 25.26	0.928	14 29.6	1.94	17.9
3	15 59.5	16 2.0	58 35.71	0.814	58 44.79	0.700	15 16.4	1.97	18.9
4	16 4.1	16 5.9	58 52.52	+0.589	58 58.95	+0.484	16 4.5	2.05	19.9
5	16 7.3	16 8.4	59 4.15	0.383	59 8.16	0.286	16 55.3	2.19	20.9
6	16 9.2	16 9.6	59 11.02	0.192	59 12.77	+0.101	17 49.7	2.35	21.9
7	16 9.8	16 9.7	59 13.44	+0.010	59 13.00	-0.084	18 48.0	2.50	22.9
8	16 9.3	16 8.5	59 11.41	-0.182	59 8.62	0.285	19 49.4	2.59	23.9
9	16 7.4	16 5.9	59 4.55	0.395	58 59.12	0.512	20 51.7	2.58	24.9
10	16 4.0	16 1.8	58 52.25	-0.635	58 43.87	-0.762	21 52.3	2.45	25.9
11	15 59.1	15 55.9	58 33.95	0.891	58 22.49	1.018	22 49.2	2.28	26.9
12	15 52.4	15 48.5	58 9.53	1.140	57 55.16	1.253	23 41.6	2.09	27.9
13	15 44.2	15 39.7	57 39.51	-1.353	57 22.76	-1.435	0	.	28.9
14	15 34.9	15 29.9	57 5.16	1.495	56 46.97	1.533	0 29.7	1.92	0.3
15	15 24.9	15 19.8	56 28.48	1.545	56 10.01	1.529	1 14.5	1.81	1.3
16	15 14.9	15 10.1	55 51.89	-1.486	55 34.45	-1.416	1 57.1	1.75	2.3
17	15 5.7	15 1.6	55 18.01	1.320	55 2.86	1.202	2 38.7	1.72	3.3
18	14 57.8	14 54.6	54 49.26	1.061	54 37.48	0.899	3 20.3	1.75	4.3
19	14 52.0	14 50.0	54 27.76	-0.718	54 20.30	-0.523	4 3.0	1.81	5.3
20	14 48.6	14 47.9	54 15.23	-0.319	54 12.67	-0.106	4 47.5	1.90	6.3
21	14 47.9	14 48.6	54 12.70	+0.112	54 15.38	+0.335	5 34.5	2.01	7.3
22	14 50.1	14 52.2	54 20.73	+0.556	54 28.70	+0.772	6 24.1	2.12	8.3
23	14 55.1	14 58.6	54 39.22	0.980	54 52.18	1.177	7 15.9	2.19	9.3
24	15 2.8	15 7.5	55 7.41	1.358	55 24.70	1.520	8 9.0	2.22	10.3
25	15 12.7	15 18.3	55 43.79	+1.658	56 4.38	+1.769	9 2.2	2.21	11.3
26	15 24.2	15 30.4	56 26.13	1.850	56 48.64	1.896	9 54.4	2.14	12.3
27	15 36.6	15 42.8	57 11.48	1.995	57 34.21	1.876	10 44.9	2.08	13.3
28	15 48.8	15 54.6	57 56.35	1.807	58 17.44	1.702	11 34.0	2.02	14.3
29	15 59.9	16 4.7	58 37.05	+1.561	58 54.78	+1.388	12 22.0	1.99	15.3

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
MONDAY 1.					WEDNESDAY 3.				
	h m s	s	° ' "	"		h m s	s	° ' "	"
0	9 59 12.93	2.0887	N. 12 11 39.0	14.529	0	11 37 49.49	2.0468	S. 0 21 1.0	16.318
1	10 1 18.18	2.0863	11 57 5.2	14.598	1	11 39 52.32	2.0477	0 37 20.2	16.322
2	10 3 23.28	2.0839	11 42 27.3	14.665	2	11 41 55.21	2.0488	0 53 39.6	16.324
3	10 5 28.25	2.0818	11 27 45.4	14.731	3	11 43 58.17	2.0499	1 9 59.1	16.325
4	10 7 33.09	2.0795	11 12 59.6	14.795	4	11 46 1.20	2.0511	1 26 18.6	16.324
5	10 9 37.79	2.0773	10 58 10.0	14.858	5	11 48 4.30	2.0523	1 42 38.0	16.323
6	10 11 42.36	2.0752	10 43 16.7	14.919	6	11 50 7.47	2.0536	1 58 57.3	16.320
7	10 13 46.81	2.0732	10 28 19.7	14.980	7	11 52 10.73	2.0551	2 15 16.4	16.316
8	10 15 51.14	2.0712	10 13 19.1	15.040	8	11 54 14.08	2.0566	2 31 35.2	16.310
9	10 17 55.35	2.0692	9 58 14.9	15.098	9	11 56 17.52	2.0582	2 47 53.6	16.303
10	10 19 59.44	2.0673	9 43 7.3	15.154	10	11 58 21.06	2.0599	3 4 11.5	16.293
11	10 22 3.42	2.0655	9 27 56.4	15.209	11	12 0 24.71	2.0617	3 20 28.8	16.283
12	10 24 7.30	2.0638	9 12 42.2	15.263	12	12 2 28.46	2.0635	3 36 45.5	16.272
13	10 26 11.07	2.0620	8 57 24.8	15.317	13	12 4 32.33	2.0654	3 53 1.4	16.258
14	10 28 14.74	2.0604	8 42 4.2	15.368	14	12 6 36.31	2.0674	4 9 16.5	16.244
15	10 30 18.32	2.0588	8 26 40.6	15.418	15	12 8 40.42	2.0695	4 25 30.7	16.228
16	10 32 21.80	2.0573	8 11 14.1	15.466	16	12 10 44.65	2.0717	4 41 43.9	16.212
17	10 34 25.20	2.0559	7 55 44.7	15.514	17	12 12 49.02	2.0739	4 57 56.1	16.193
18	10 36 28.51	2.0545	7 40 12.4	15.561	18	12 14 53.52	2.0763	5 14 7.1	16.173
19	10 38 31.74	2.0532	7 24 37.4	15.605	19	12 16 58.17	2.0787	5 30 16.8	16.150
20	10 40 34.89	2.0519	7 8 59.8	15.648	20	12 19 2.96	2.0812	5 46 25.1	16.127
21	10 42 37.97	2.0508	6 53 19.6	15.691	21	12 21 7.91	2.0838	6 2 32.0	16.103
22	10 44 40.98	2.0497	6 37 36.9	15.732	22	12 23 13.02	2.0865	6 18 37.4	16.078
23	10 46 43.93	2.0487	N. 6 21 51.8	15.771	23	12 25 18.29	2.0893	S. 6 34 41.3	16.050
TUESDAY 2.					THURSDAY 4.				
	h m s	s	° ' "	"		h m s	s	° ' "	"
0	10 48 46.82	2.0477	N. 6 6 4.4	15.809	0	12 27 23.73	2.0921	S. 6 50 43.4	16.020
1	10 50 49.65	2.0468	5 50 14.7	15.846	1	12 29 29.34	2.0950	7 6 43.7	15.990
2	10 52 52.43	2.0459	5 34 22.9	15.881	2	12 31 35.13	2.0980	7 22 42.2	15.958
3	10 54 55.16	2.0452	5 18 29.0	15.915	3	12 33 41.10	2.1011	7 38 38.7	15.925
4	10 56 57.85	2.0445	5 2 33.1	15.948	4	12 35 47.26	2.1043	7 54 33.2	15.890
5	10 59 0.50	2.0439	4 46 35.3	15.979	5	12 37 53.61	2.1075	8 10 25.5	15.853
6	11 1 3.12	2.0434	4 30 35.6	16.009	6	12 40 0.16	2.1108	8 26 15.6	15.816
7	11 3 5.71	2.0429	4 14 34.2	16.038	7	12 42 6.91	2.1143	8 42 3.4	15.777
8	11 5 8.27	2.0425	3 58 31.1	16.065	8	12 44 13.87	2.1178	8 57 48.8	15.736
9	11 7 10.81	2.0422	3 42 26.4	16.092	9	12 46 21.04	2.1213	9 13 31.7	15.693
10	11 9 13.33	2.0419	3 26 20.1	16.117	10	12 48 28.43	2.1250	9 29 12.0	15.649
11	11 11 15.84	2.0418	3 10 12.4	16.139	11	12 50 36.04	2.1288	9 44 49.6	15.603
12	11 13 18.34	2.0417	2 54 3.4	16.161	12	12 52 43.88	2.1326	10 0 24.4	15.557
13	11 15 20.84	2.0417	2 37 53.1	16.182	13	12 54 51.95	2.1364	10 15 56.4	15.508
14	11 17 23.34	2.0418	2 21 41.6	16.201	14	12 57 0.25	2.1403	10 31 25.4	15.458
15	11 19 25.85	2.0419	2 5 29.0	16.219	15	12 59 8.79	2.1444	10 46 51.4	15.408
16	11 21 28.37	2.0421	1 49 15.3	16.236	16	13 1 17.58	2.1485	11 2 14.3	15.354
17	11 23 30.90	2.0424	1 33 0.7	16.250	17	13 3 26.61	2.1527	11 17 33.9	15.299
18	11 25 33.46	2.0428	1 16 45.3	16.263	18	13 5 35.90	2.1570	11 32 50.2	15.243
19	11 27 36.04	2.0433	1 0 29.1	16.277	19	13 7 45.45	2.1613	11 48 3.1	15.185
20	11 29 38.65	2.0438	0 44 12.1	16.288	20	13 9 55.26	2.1657	12 3 12.4	15.126
21	11 31 41.30	2.0444	0 27 54.5	16.297	21	13 12 5.33	2.1702	12 18 18.2	15.066
22	11 33 43.98	2.0451	N. 0 11 36.5	16.305	22	13 14 15.68	2.1747	12 33 20.3	15.003
23	11 35 46.71	2.0459	S. 0 4 42.1	16.313	23	13 16 26.30	2.1793	12 48 18.5	14.938
24	11 37 49.49	2.0468	S. 0 21 1.0	16.318	24	13 18 37.20	2.1841	S. 13 3 12.9	14.873

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
FRIDAY 5.					SUNDAY 7.				
0	h m s	s	° ' "	"	0	h m s	s	° ' "	"
0	13 18 37.20	2.1841	S. 13 3 12.9	14.873	0	15 9 52.06	2.4628	S. 23 11 8.0	9.833
1	13 20 48.39	2.1888	13 18 3.3	14.807	1	15 12 20.01	2.4689	23 20 53.7	9.689
2	13 22 59.86	2.1937	13 32 49.7	14.738	2	15 14 48.33	2.4749	23 30 30.7	9.543
3	13 25 11.63	2.1986	13 47 31.9	14.668	3	15 17 17.00	2.4808	23 39 58.8	9.395
4	13 27 23.69	2.2034	14 2 9.8	14.596	4	15 19 46.03	2.4868	23 49 18.1	9.247
5	13 29 36.05	2.2084	14 16 43.4	14.523	5	15 22 15.41	2.4927	23 58 28.4	9.097
6	13 31 48.71	2.2136	14 31 12.5	14.448	6	15 24 45.15	2.4986	24 7 29.7	8.945
7	13 34 1.68	2.2188	14 45 37.1	14.371	7	15 27 15.24	2.5043	24 16 21.8	8.792
8	13 36 14.96	2.2240	14 59 57.0	14.293	8	15 29 45.67	2.5100	24 25 4.7	8.638
9	13 38 28.56	2.2293	15 14 12.2	14.213	9	15 32 16.44	2.5157	24 33 38.3	8.482
10	13 40 42.47	2.2346	15 28 22.6	14.132	10	15 34 47.55	2.5213	24 42 2.5	8.324
11	13 42 56.71	2.2400	15 42 28.0	14.048	11	15 37 19.00	2.5269	24 50 17.2	8.165
12	13 45 11.27	2.2454	15 56 28.4	13.964	12	15 39 50.78	2.5323	24 58 22.3	8.005
13	13 47 26.16	2.2509	16 10 23.7	13.878	13	15 42 22.88	2.5378	25 6 17.8	7.843
14	13 49 41.38	2.2565	16 24 13.7	13.789	14	15 44 55.31	2.5432	25 14 3.5	7.681
15	13 51 56.94	2.2622	16 37 58.4	13.700	15	15 47 28.06	2.5483	25 21 39.5	7.518
16	13 54 12.84	2.2678	16 51 37.7	13.609	16	15 50 1.11	2.5535	25 29 5.6	7.352
17	13 56 29.08	2.2735	17 5 11.5	13.517	17	15 52 34.48	2.5586	25 36 21.7	7.184
18	13 58 45.66	2.2793	17 18 39.7	13.422	18	15 55 8.14	2.5635	25 43 27.7	7.016
19	14 1 2.59	2.2851	17 32 2.1	13.325	19	15 57 42.10	2.5684	25 50 23.6	6.848
20	14 3 19.87	2.2909	17 45 18.7	13.228	20	16 0 16.35	2.5733	25 57 9.4	6.678
21	14 5 37.50	2.2968	17 58 29.5	13.130	21	16 2 50.89	2.5780	26 3 45.0	6.507
22	14 7 55.48	2.3027	18 11 34.3	13.028	22	16 5 25.71	2.5826	26 10 10.2	6.333
23	14 10 13.82	2.3087	S. 18 24 32.9	12.925	23	16 8 0.80	2.5870	S. 26 16 25.0	6.160
SATURDAY 6.					MONDAY 8.				
0	h m s	s	° ' "	"	0	h m s	s	° ' "	"
0	14 12 32.52	2.3147	S. 18 37 25.3	12.821	0	16 10 36.15	2.5914	S. 26 22 29.4	5.986
1	14 14 51.58	2.3207	18 50 11.4	12.715	1	16 13 11.77	2.5957	26 28 23.3	5.809
2	14 17 11.00	2.3268	19 2 51.1	12.608	2	16 15 47.64	2.5998	26 34 6.5	5.632
3	14 19 30.79	2.3328	19 15 24.3	12.499	3	16 18 23.75	2.6038	26 39 39.1	5.454
4	14 21 50.94	2.3388	19 27 51.0	12.388	4	16 21 0.10	2.6078	26 45 1.0	5.276
5	14 24 11.46	2.3451	19 40 10.9	12.275	5	16 23 36.68	2.6115	26 50 12.2	5.096
6	14 26 32.35	2.3513	19 52 24.0	12.162	6	16 26 13.48	2.6152	26 55 12.5	4.915
7	14 28 53.61	2.3574	20 4 30.3	12.046	7	16 28 50.50	2.6188	27 0 2.0	4.733
8	14 31 15.24	2.3636	20 16 29.5	11.928	8	16 31 27.73	2.6221	27 4 40.5	4.551
9	14 33 37.24	2.3698	20 28 21.7	11.810	9	16 34 5.15	2.6253	27 9 8.1	4.368
10	14 35 59.61	2.3760	20 40 6.7	11.689	10	16 36 42.77	2.6285	27 13 24.7	4.184
11	14 38 22.36	2.3823	20 51 44.4	11.563	11	16 39 20.57	2.6314	27 17 30.2	3.999
12	14 40 45.48	2.3885	21 3 14.7	11.443	12	16 41 58.54	2.6343	27 21 24.6	3.813
13	14 43 8.98	2.3948	21 14 37.5	11.318	13	16 44 36.68	2.6369	27 25 7.8	3.628
14	14 45 32.85	2.4009	21 25 52.8	11.191	14	16 47 14.97	2.6394	27 28 39.9	3.441
15	14 47 57.09	2.4072	21 37 0.4	11.063	15	16 49 53.41	2.6418	27 32 0.7	3.253
16	14 50 21.71	2.4135	21 48 0.3	10.932	16	16 52 31.99	2.6441	27 35 10.3	3.066
17	14 52 46.71	2.4198	21 58 52.2	10.799	17	16 55 10.70	2.6462	27 38 8.6	2.878
18	14 55 12.08	2.4259	22 9 36.2	10.667	18	16 57 49.53	2.6481	27 40 55.6	2.688
19	14 57 37.82	2.4321	22 20 12.2	10.532	19	17 0 28.47	2.6498	27 43 31.2	2.499
20	15 0 3.93	2.4383	22 30 40.0	10.395	20	17 3 7.50	2.6513	27 45 55.5	2.310
21	15 2 30.41	2.4444	22 40 59.6	10.258	21	17 5 46.63	2.6528	27 48 8.4	2.129
22	15 4 57.26	2.4506	22 51 10.9	10.118	22	17 8 25.84	2.6541	27 50 9.8	1.948
23	15 7 24.48	2.4567	23 1 13.7	9.976	23	17 11 5.12	2.6552	27 51 59.8	1.758
24	15 9 52.06	2.4628	S. 23 11 8.0	9.833	24	17 13 44.46	2.6561	S. 27 53 38.3	1.566

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
TUESDAY 9.					THURSDAY 11.				
0	h m s	s	° ' "	"	0	h m s	s	° ' "	"
0	17 13 44.46	2.6561	S. 27 53 38.3	1.546	0	19 19 11.37	2.5139	S. 25 32 26.8	7.156
1	17 16 23.85	2.6568	27 55 5.3	1.355	1	19 21 42.02	2.5078	25 25 12.7	7.313
2	17 19 3.28	2.6575	27 56 20.9	1.164	2	19 24 12.30	2.5015	25 17 49.2	7.468
3	17 21 42.75	2.6579	27 57 25.0	0.973	3	19 26 42.20	2.4953	25 10 16.5	7.623
4	17 24 22.23	2.6582	27 58 17.6	0.781	4	19 29 11.73	2.4889	25 2 34.5	7.776
5	17 27 1.73	2.6583	27 58 58.7	0.588	5	19 31 40.87	2.4824	24 54 43.4	7.926
6	17 29 41.23	2.6582	27 59 28.2	0.397	6	19 34 9.62	2.4759	24 46 43.3	8.076
7	17 32 20.71	2.6579	27 59 46.3	0.206	7	19 36 37.98	2.4694	24 38 34.3	8.224
8	17 35 0.18	2.6576	27 59 52.9	-0.014	8	19 39 5.95	2.4628	24 30 16.4	8.371
9	17 37 39.62	2.6570	27 59 48.0	+0.178	9	19 41 33.52	2.4561	24 21 49.8	8.516
10	17 40 19.02	2.6562	27 59 31.6	0.369	10	19 44 0.68	2.4493	24 13 14.5	8.659
11	17 42 58.36	2.6553	27 59 3.7	0.561	11	19 46 27.43	2.4424	24 4 30.7	8.801
12	17 45 37.65	2.6543	27 58 24.3	0.752	12	19 48 53.77	2.4356	23 55 38.4	8.942
13	17 48 16.87	2.6529	27 57 33.5	0.943	13	19 51 19.70	2.4287	23 46 37.7	9.080
14	17 50 56.00	2.6514	27 56 31.2	1.133	14	19 53 45.21	2.4218	23 37 28.8	9.217
15	17 53 35.04	2.6498	27 55 17.5	1.323	15	19 56 10.31	2.4148	23 28 11.7	9.352
16	17 56 13.98	2.6481	27 53 52.4	1.513	16	19 58 34.99	2.4078	23 18 46.6	9.485
17	17 58 52.81	2.6461	27 52 16.0	1.702	17	20 0 59.24	2.4007	23 9 13.5	9.618
18	18 1 31.51	2.6440	27 50 28.2	1.891	18	20 3 23.07	2.3936	22 59 32.5	9.748
19	18 4 10.09	2.6418	27 48 29.1	2.079	19	20 5 46.47	2.3865	22 49 43.7	9.877
20	18 6 48.53	2.6393	27 46 18.7	2.267	20	20 8 9.45	2.3794	22 39 47.3	10.003
21	18 9 26.81	2.6367	27 43 57.1	2.453	21	20 10 32.00	2.3723	22 29 43.3	10.128
22	18 12 4.93	2.6340	27 41 24.3	2.639	22	20 12 54.12	2.3651	22 19 31.9	10.252
23	18 14 42.89	2.6312	S. 27 38 40.3	2.826	23	20 15 15.81	2.3579	S. 22 9 13.1	10.374
WEDNESDAY 10.					FRIDAY 12.				
0	h m s	s	° ' "	"	0	h m s	s	° ' "	"
0	18 17 20.67	2.6281	S. 27 35 45.2	3.011	0	20 17 37.07	2.3508	S. 21 58 47.0	10.494
1	18 19 58.26	2.6248	27 32 39.0	3.195	1	20 19 57.90	2.3435	21 48 13.8	10.613
2	18 22 35.65	2.6214	27 29 21.8	3.379	2	20 22 18.29	2.3363	21 37 33.5	10.729
3	18 25 12.83	2.6178	27 25 53.5	3.562	3	20 24 38.25	2.3291	21 26 46.3	10.843
4	18 27 49.79	2.6142	27 22 14.3	3.743	4	20 26 57.78	2.3218	21 15 52.3	10.957
5	18 30 26.53	2.6103	27 18 24.3	3.924	5	20 29 16.87	2.3146	21 4 51.5	11.069
6	18 33 3.03	2.6064	27 14 23.4	4.105	6	20 31 35.53	2.3074	20 53 44.0	11.179
7	18 35 39.30	2.6024	27 10 11.7	4.284	7	20 33 53.76	2.3002	20 42 30.0	11.287
8	18 38 15.32	2.5981	27 5 49.3	4.463	8	20 36 11.55	2.2930	20 31 9.6	11.393
9	18 40 51.07	2.5937	27 1 16.2	4.640	9	20 38 28.92	2.2858	20 19 42.9	11.498
10	18 43 26.56	2.5893	26 56 32.5	4.816	10	20 40 45.85	2.2787	20 8 9.9	11.601
11	18 46 1.78	2.5847	26 51 38.3	4.991	11	20 43 2.36	2.2715	19 56 30.8	11.703
12	18 48 36.72	2.5798	26 46 33.6	5.165	12	20 45 18.43	2.2643	19 44 45.6	11.802
13	18 51 11.36	2.5749	26 41 18.5	5.338	13	20 47 34.08	2.2573	19 32 54.6	11.899
14	18 53 45.71	2.5699	26 35 53.1	5.509	14	20 49 49.30	2.2502	19 20 57.7	11.996
15	18 56 19.75	2.5648	26 30 17.4	5.680	15	20 52 4.10	2.2432	19 8 55.1	12.090
16	18 58 53.48	2.5595	26 24 31.5	5.849	16	20 54 18.48	2.2361	18 56 46.9	12.183
17	19 1 26.89	2.5542	26 18 35.5	6.017	17	20 56 32.43	2.2290	18 44 33.2	12.274
18	19 3 59.98	2.5488	26 12 29.5	6.183	18	20 58 45.96	2.2221	18 32 14.0	12.363
19	19 6 32.74	2.5432	26 6 13.5	6.349	19	21 0 59.08	2.2152	18 19 49.6	12.451
20	19 9 5.16	2.5375	25 59 47.6	6.513	20	21 3 11.78	2.2083	18 7 19.9	12.538
21	19 11 37.24	2.5318	25 53 11.9	6.676	21	21 5 24.07	2.2014	17 54 45.1	12.622
22	19 14 8.97	2.5259	25 46 26.5	6.839	22	21 7 35.95	2.1945	17 42 5.3	12.704
23	19 16 40.35	2.5200	25 39 31.4	6.998	23	21 9 47.41	2.1877	17 29 20.6	12.785
24	19 19 11.37	2.5139	S. 25 32 26.8	7.156	24	21 11 58.47	2.1810	S. 17 16 31.1	12.864

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

R.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
SATURDAY 13.					MONDAY 15.				
	h m s		" "	" "		h m s		" "	" "
21	11 58.47	2.1810	S. 17 16 31.1	12.864	0	22 49 57.83	1.9276	S. 5 56 47.9	14.914
21	14 9.13	2.1743	17 3 36.9	12.947	1	22 51 53.38	1.9240	5 41 52.7	14.924
21	16 19.38	2.1676	16 50 38.1	13.018	2	22 53 48.71	1.9205	5 26 57.0	14.933
21	18 29.24	2.1611	16 37 34.7	13.093	3	22 55 43.84	1.9171	5 12 0.8	14.941
21	20 38.71	2.1545	16 24 26.9	13.166	4	22 57 38.76	1.9138	4 57 4.1	14.948
21	22 47.78	2.1479	16 11 14.8	13.237	5	22 59 33.49	1.9106	4 42 7.0	14.954
21	24 56.46	2.1414	15 57 58.5	13.306	6	23 1 28.03	1.9074	4 27 9.6	14.958
21	27 4.75	2.1350	15 44 38.1	13.374	7	23 3 22.38	1.9043	4 12 12.0	14.961
21	29 12.66	2.1287	15 31 13.6	13.442	8	23 5 16.55	1.9013	3 57 14.3	14.963
21	31 20.19	2.1223	15 17 45.1	13.507	9	23 7 10.53	1.8983	3 42 16.4	14.966
21	33 27.34	2.1161	15 4 12.8	13.569	10	23 9 4.34	1.8954	3 27 18.4	14.966
21	35 34.12	2.1099	14 50 36.8	13.631	11	23 10 57.98	1.8927	3 12 20.5	14.964
21	37 40.53	2.1038	14 36 57.1	13.692	12	23 12 51.46	1.8900	2 57 22.7	14.963
21	39 46.57	2.0977	14 23 13.8	13.750	13	23 14 44.78	1.8873	2 42 25.0	14.960
21	41 52.25	2.0917	14 9 27.1	13.807	14	23 16 37.94	1.8848	2 27 27.5	14.956
21	43 57.57	2.0858	13 55 37.0	13.863	15	23 18 30.95	1.8823	2 12 30.3	14.950
21	46 2.54	2.0798	13 41 43.6	13.917	16	23 20 23.81	1.8798	1 57 33.5	14.944
21	48 7.15	2.0740	13 27 47.0	13.969	17	23 22 16.53	1.8775	1 42 37.0	14.938
21	50 11.42	2.0683	13 13 47.3	14.020	18	23 24 9.11	1.8753	1 27 41.0	14.929
21	52 15.34	2.0625	12 59 44.6	14.070	19	23 26 1.56	1.8731	1 12 45.5	14.921
21	54 18.92	2.0568	12 45 38.9	14.118	20	23 27 53.88	1.8710	0 57 50.5	14.911
21	56 22.16	2.0513	12 31 30.4	14.165	21	23 29 46.08	1.8689	0 42 56.2	14.899
21	58 25.07	2.0458	12 17 19.1	14.211	22	23 31 38.15	1.8669	0 28 2.6	14.888
22	0 27.65	2.0403	S. 12 3 5.1	14.254	23	23 33 30.11	1.8651	S. 0 13 9.7	14.875
SUNDAY 14.					TUESDAY 16.				
	h m s		" "	" "		h m s		" "	" "
22	2 29.91	2.0350	S. 11 48 48.6	14.296	0	23 35 21.96	1.8633	N. 0 1 42.4	14.861
22	4 31.85	2.0297	11 34 29.6	14.338	1	23 37 13.71	1.8616	0 16 33.6	14.846
22	6 33.47	2.0244	11 20 8.1	14.378	2	23 39 5.35	1.8598	0 31 23.9	14.830
22	8 34.78	2.0193	11 5 44.3	14.415	3	23 40 56.89	1.8581	0 46 13.2	14.813
22	10 35.79	2.0143	10 51 18.3	14.452	4	23 42 48.34	1.8568	1 1 1.5	14.797
22	12 36.49	2.0092	10 36 50.1	14.488	5	23 44 39.70	1.8553	1 15 48.8	14.778
22	14 36.89	2.0042	10 22 19.8	14.523	6	23 46 30.97	1.8539	1 30 34.9	14.758
22	16 36.99	1.9993	10 7 47.5	14.554	7	23 48 22.17	1.8527	1 45 19.8	14.738
22	18 36.80	1.9945	9 53 13.3	14.586	8	23 50 13.29	1.8514	2 0 3.4	14.716
22	20 36.33	1.9898	9 38 37.2	14.616	9	23 52 4.34	1.8503	2 14 45.7	14.694
22	22 35.57	1.9851	9 23 59.4	14.644	10	23 53 55.32	1.8491	2 29 26.7	14.672
22	24 34.54	1.9805	9 9 19.9	14.672	11	23 55 46.23	1.8481	2 44 6.3	14.648
22	26 33.23	1.9759	8 54 38.8	14.698	12	23 57 37.09	1.8472	2 58 44.4	14.623
22	28 31.65	1.9715	8 39 56.2	14.723	13	23 59 27.89	1.8463	3 13 21.0	14.597
22	30 29.81	1.9672	8 25 12.1	14.747	14	0 1 18.65	1.8456	3 27 56.0	14.570
22	32 27.71	1.9628	8 10 26.6	14.768	15	0 3 9.36	1.8448	3 42 29.4	14.543
22	34 25.35	1.9586	7 55 39.9	14.789	16	0 5 0.93	1.8442	3 57 1.2	14.515
22	36 22.74	1.9545	7 40 51.9	14.810	17	0 6 50.66	1.8436	4 11 31.2	14.486
22	38 19.89	1.9504	7 26 2.7	14.828	18	0 8 41.26	1.8431	4 25 59.5	14.456
22	40 16.79	1.9464	7 11 12.5	14.845	19	0 10 31.83	1.8426	4 40 25.9	14.425
22	42 13.46	1.9425	6 56 21.3	14.861	20	0 12 22.37	1.8423	4 54 50.5	14.394
22	44 9.89	1.9386	6 41 29.2	14.876	21	0 14 12.90	1.8420	5 9 13.2	14.362
22	46 6.09	1.9348	6 26 36.2	14.890	22	0 16 3.41	1.8417	5 23 33.9	14.328
22	48 2.07	1.9312	6 11 42.4	14.903	23	0 17 53.90	1.8415	5 37 52.6	14.294
22	49 57.83	1.9276	S. 5 56 47.9	14.914	24	0 19 44.39	1.8415	N. 5 52 9.2	14.259

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
WEDNESDAY 17.					FRIDAY 19.				
	h m s	s	° ' "	"		h m s	s	° ' "	"
0	19 44.39	1.8415	N. 5 52 9.2	14.259	0	1 49 15.88	1.9119	N. 16 22 1.6	11.703
1	21 34.88	1.8415	6 6 23.7	14.223	1	1 51 10.68	1.9148	16 33 41.6	11.631
2	23 25.37	1.8415	6 20 36.0	14.188	2	1 53 5.66	1.9178	16 45 17.3	11.559
3	25 15.86	1.8416	6 34 42.3	14.151	3	1 55 0.81	1.9207	16 56 48.7	11.487
4	27 6.36	1.8418	6 48 54.1	14.113	4	1 56 56.14	1.9238	17 8 15.7	11.413
5	28 56.88	1.8421	7 2 59.7	14.074	5	1 58 51.66	1.9268	17 19 38.3	11.339
6	30 47.41	1.8424	7 17 3.0	14.034	6	2 0 47.36	1.9298	17 30 56.4	11.264
7	32 37.97	1.8428	7 31 3.8	13.993	7	2 2 43.24	1.9329	17 42 10.0	11.189
8	34 28.55	1.8432	7 45 2.2	13.953	8	2 4 39.31	1.9362	17 53 19.1	11.113
9	36 19.15	1.8437	7 58 58.1	13.911	9	2 6 35.58	1.9394	18 4 23.6	11.036
10	38 9.79	1.8443	8 12 51.5	13.868	10	2 8 32.04	1.9427	18 15 23.4	10.958
11	40 0 47	1.8450	8 26 42.3	13.825	11	2 10 28.70	1.9460	18 26 18.6	10.880
12	41 51.19	1.8457	8 40 30.5	13.781	12	2 12 25.56	1.9493	18 37 9.0	10.801
13	43 41.95	1.8464	8 54 16.0	13.736	13	2 14 22.62	1.9528	18 47 54.7	10.721
14	45 32.76	1.8473	9 7 58.8	13.690	14	2 16 19.89	1.9562	18 58 35.5	10.640
15	47 23.63	1.8483	9 21 38.8	13.643	15	2 18 17.36	1.9596	19 9 11.5	10.559
16	49 14.55	1.8492	9 35 16.0	13.597	16	2 20 15.04	1.9631	19 19 42.6	10.477
17	51 5.53	1.8503	9 48 50.4	13.549	17	2 22 12.93	1.9667	19 30 8.7	10.394
18	52 56.58	1.8513	10 2 21.9	13.501	18	2 24 11.04	1.9703	19 40 29.9	10.311
19	54 47.69	1.8525	10 15 50.5	13.451	19	2 26 9.36	1.9738	19 50 46.0	10.227
20	56 38.88	1.8538	10 29 16.0	13.400	20	2 28 7.90	1.9775	20 0 57.1	10.142
21	58 30.14	1.8550	10 42 38.5	13.350	21	2 30 6.66	1.9812	20 11 3.0	10.056
22	1 0 21.48	1.8563	10 55 58.0	13.298	22	2 32 5.64	1.9849	20 21 3.8	9.970
23	1 2 12.90	1.8578	N. 11 9 14.3	13.245	23	2 34 4.85	1.9887	N. 20 30 59.4	9.883
THURSDAY 18.					SATURDAY 20.				
	h m s	s	° ' "	"		h m s	s	° ' "	"
0	1 4 4.42	1.8593	N. 11 22 27.4	13.192	0	2 36 4.28	1.9924	N. 20 40 49.8	9.795
1	1 5 56.02	1.8608	11 35 37.3	13.138	1	2 38 3.94	1.9963	20 50 34.8	9.706
2	1 7 47.72	1.8624	11 48 44.0	13.084	2	2 40 3.83	2.0001	21 0 14.5	9.617
3	1 9 39.51	1.8640	12 1 47.4	13.029	3	2 42 3.95	2.0039	21 9 48.8	9.526
4	1 11 31.40	1.8658	12 14 47.5	12.973	4	2 44 4.30	2.0078	21 19 17.6	9.435
5	1 13 23.40	1.8676	12 27 44.2	12.917	5	2 46 4.88	2.0117	21 28 41.0	9.344
6	1 15 15.51	1.8694	12 40 37.5	12.859	6	2 48 5.70	2.0157	21 37 58.9	9.252
7	1 17 7.73	1.8713	12 53 27.3	12.801	7	2 50 6.76	2.0196	21 47 11.2	9.158
8	1 19 0.06	1.8733	13 6 13.6	12.742	8	2 52 8.05	2.0236	21 56 17.9	9.064
9	1 20 52.52	1.8753	13 18 56.3	12.683	9	2 54 9.59	2.0276	22 5 18.9	8.969
10	1 22 45.10	1.8773	13 31 35.5	12.623	10	2 56 11.36	2.0315	22 14 14.2	8.874
11	1 24 37.80	1.8794	13 44 11.0	12.561	11	2 58 13.37	2.0356	22 23 3.8	8.778
12	1 26 30.63	1.8817	13 56 42.8	12.499	12	3 0 15.63	2.0397	22 31 47.6	8.682
13	1 28 23.60	1.8839	14 9 10.9	12.437	13	3 2 18.13	2.0438	22 40 25.6	8.583
14	1 30 16.70	1.8862	14 21 35.2	12.373	14	3 4 20.88	2.0478	22 48 57.6	8.485
15	1 32 9.94	1.8885	14 33 55.7	12.310	15	3 6 23.87	2.0519	22 57 23.8	8.387
16	1 34 3.32	1.8909	14 46 12.4	12.246	16	3 8 27.11	2.0560	23 5 44.0	8.286
17	1 35 56.85	1.8933	14 58 25.2	12.180	17	3 10 30.59	2.0602	23 13 58.1	8.185
18	1 37 50.52	1.8958	15 10 34.0	12.113	18	3 12 34.33	2.0643	23 22 6.2	8.084
19	1 39 44.35	1.8984	15 22 38.8	12.047	19	3 14 38.31	2.0684	23 30 8.2	7.982
20	1 41 38.33	1.9010	15 34 39.6	11.979	20	3 16 42.54	2.0725	23 38 4.0	7.879
21	1 43 32.47	1.9038	15 46 36.3	11.911	21	3 18 47.01	2.0767	23 45 53.7	7.776
22	1 45 26.78	1.9065	15 58 28.9	11.842	22	3 20 51.74	2.0809	23 53 37.1	7.670
23	1 47 21.25	1.9092	16 10 17.3	11.773	23	3 22 56.72	2.0851	24 1 14.1	7.565
24	1 49 15.88	1.9119	N. 16 22 1.6	11.703	24	3 25 1.95	2.0893	N. 24 8 44.9	7.460

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
SUNDAY 21.					TUESDAY 23.				
0	h m s	s	"	"	0	h m s	s	"	"
0	3 25 1.95	2.0893	N. 24 8 44.9	7.460	0	5 9 48.42	2.2633	N. 27 51 12.9	1.557
1	3 27 7.43	2.0934	24 16 9.3	7.353	1	5 12 4.29	2.2658	27 52 42.2	1.419
2	3 29 13.16	2.0976	24 23 27.3	7.246	2	5 14 20.31	2.2682	27 54 3.2	1.281
3	3 31 19.14	2.1017	24 30 38.8	7.138	3	5 16 36.47	2.2706	27 55 15.9	1.142
4	3 33 25.36	2.1058	24 37 43.8	7.029	4	5 18 52.78	2.2729	27 56 20.2	1.003
5	3 35 31.84	2.1101	24 44 42.3	6.919	5	5 21 9.22	2.2751	27 57 16.2	0.863
6	3 37 38.57	2.1142	24 51 34.1	6.808	6	5 23 25.79	2.2773	27 58 3.8	0.723
7	3 39 45.54	2.1183	24 58 19.3	6.698	7	5 25 42.50	2.2794	27 58 43.0	0.583
8	3 41 52.76	2.1224	25 4 57.8	6.586	8	5 27 59.32	2.2813	27 59 13.8	0.443
9	3 44 0.23	2.1266	25 11 29.6	6.473	9	5 30 16.26	2.2833	27 59 36.2	0.303
10	3 46 7.95	2.1308	25 17 54.6	6.360	10	5 32 33.32	2.2853	27 59 50.1	0.160
11	3 48 15.92	2.1348	25 24 12.8	6.246	11	5 34 50.49	2.2874	27 59 55.4	+0.018
12	3 50 24.13	2.1388	25 30 24.1	6.131	12	5 37 7.76	2.2887	27 59 52.3	-0.123
13	3 52 32.58	2.1429	25 36 28.5	6.015	13	5 39 25.13	2.2903	27 59 40.6	0.266
14	3 54 41.28	2.1470	25 42 25.9	5.899	14	5 41 42.60	2.2919	27 59 20.4	0.408
15	3 56 50.22	2.1510	25 48 16.4	5.783	15	5 44 0.16	2.2934	27 58 51.6	0.551
16	3 58 59.40	2.1550	25 53 59.8	5.664	16	5 46 17.81	2.2948	27 58 14.3	0.694
17	4 1 8.82	2.1590	25 59 36.1	5.547	17	5 48 35.54	2.2962	27 57 28.3	0.838
18	4 3 18.48	2.1630	26 5 5.4	5.428	18	5 50 53.35	2.2975	27 56 33.7	0.982
19	4 5 28.38	2.1669	26 10 27.5	5.308	19	5 53 11.24	2.2987	27 55 30.5	1.125
20	4 7 38.51	2.1708	26 15 42.3	5.187	20	5 55 29.19	2.2998	27 54 18.7	1.269
21	4 9 48.87	2.1746	26 20 49.9	5.066	21	5 57 47.21	2.3008	27 52 58.2	1.414
22	4 11 59.46	2.1785	26 25 50.2	4.944	22	6 0 5.28	2.3017	27 51 29.0	1.558
23	4 14 10.29	2.1823	N. 26 30 43.2	4.822	23	6 2 23.41	2.3026	N. 27 49 51.2	1.703
MONDAY 22.					WEDNESDAY 24.				
0	4 16 21.34	2.1861	N. 26 35 28.8	4.698	0	6 4 41.59	2.3034	N. 27 48 4.7	1.848
1	4 18 32.62	2.1898	26 40 7.0	4.574	1	6 6 59.82	2.3041	27 46 9.5	1.993
2	4 20 44.12	2.1936	26 44 37.7	4.450	2	6 9 18.08	2.3047	27 44 5.6	2.138
3	4 22 55.85	2.1973	26 49 1.0	4.325	3	6 11 36.38	2.3053	27 41 52.9	2.283
4	4 25 7.79	2.2008	26 53 16.7	4.199	4	6 13 54.71	2.3057	27 39 31.6	2.428
5	4 27 19.95	2.2044	26 57 24.9	4.073	5	6 16 13.06	2.3061	27 37 1.6	2.573
6	4 29 32.32	2.2080	27 1 25.5	3.946	6	6 18 31.44	2.3065	27 34 22.8	2.719
7	4 31 44.91	2.2116	27 5 18.4	3.818	7	6 20 49.84	2.3067	27 31 35.3	2.864
8	4 33 57.71	2.2150	27 9 3.6	3.689	8	6 23 8.24	2.3068	27 28 39.1	3.010
9	4 36 10.71	2.2183	27 12 41.1	3.561	9	6 25 26.66	2.3069	27 25 34.1	3.156
10	4 38 23.91	2.2218	27 16 10.9	3.431	10	6 27 45.07	2.3068	27 22 20.4	3.301
11	4 40 37.32	2.2251	27 19 32.8	3.300	11	6 30 3.48	2.3068	27 18 58.0	3.446
12	4 42 50.92	2.2283	27 22 46.9	3.169	12	6 32 21.89	2.3067	27 15 26.9	3.591
13	4 45 4.71	2.2315	27 25 53.1	3.038	13	6 34 40.28	2.3064	27 11 47.1	3.737
14	4 47 18.70	2.2347	27 28 51.5	2.907	14	6 36 58.66	2.3062	27 7 58.5	3.882
15	4 49 32.88	2.2378	27 31 41.9	2.773	15	6 39 17.02	2.3058	27 4 1.3	4.027
16	4 51 47.24	2.2409	27 34 24.3	2.641	16	6 41 35.35	2.3053	26 59 55.3	4.173
17	4 54 1.79	2.2440	27 36 58.8	2.508	17	6 43 53.65	2.3048	26 55 40.6	4.317
18	4 56 16.52	2.2469	27 39 25.2	2.373	18	6 46 11.92	2.3042	26 51 17.3	4.461
19	4 58 31.42	2.2498	27 41 43.5	2.238	19	6 48 30.15	2.3035	26 46 45.3	4.606
20	5 0 46.49	2.2526	27 43 53.7	2.103	20	6 50 48.34	2.3028	26 42 4.6	4.751
21	5 3 1.73	2.2553	27 45 55.8	1.967	21	6 53 6.48	2.3019	26 37 15.2	4.895
22	5 5 17.13	2.2581	27 47 49.7	1.830	22	6 55 24.57	2.3011	26 32 17.2	5.038
23	5 7 32.70	2.2608	27 49 35.4	1.693	23	6 57 42.61	2.3002	26 27 10.6	5.182
24	5 9 48.42	2.2633	N. 27 51 12.9	1.557	24	7 0 0.59	2.2991	N. 26 21 55.4	5.326

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
THURSDAY 25.					SATURDAY 27.				
0	h m s	s	" "	" "	0	h m s	s	" "	" "
1	7 0 0.59	2.2991	N. 26 21 55.4	5.326	1	8 48 12.07	2.1959	N. 19 29 36.8	11.609
2	7 2 18.50	2.2980	26 16 31.5	5.469	2	8 50 23.75	2.1933	19 17 56.9	11.721
3	7 4 36.35	2.2968	26 10 59.1	5.612	3	8 52 35.26	2.1905	19 6 10.3	11.833
4	7 6 54.12	2.2956	26 5 18.1	5.754	4	8 54 46.61	2.1879	18 54 17.0	11.943
5	7 9 11.82	2.2943	25 59 28.6	5.897	5	8 56 57.81	2.1853	18 42 17.2	12.052
6	7 11 29.44	2.2930	25 53 30.5	6.038	6	8 59 8.85	2.1828	18 30 10.8	12.161
7	7 13 46.98	2.2916	25 47 24.0	6.179	7	9 1 19.74	2.1802	18 17 57.9	12.268
8	7 16 4.43	2.2901	25 41 9.0	6.321	8	9 3 30.47	2.1775	18 5 38.6	12.375
9	7 18 21.79	2.2886	25 34 45.5	6.463	9	9 5 41.04	2.1749	17 53 12.9	12.480
10	7 20 39.06	2.2870	25 28 13.5	6.603	10	9 7 51.46	2.1723	17 40 41.0	12.584
11	7 22 56.23	2.2853	25 21 33.2	6.743	11	9 10 1.72	2.1698	17 28 2.8	12.688
12	7 25 13.30	2.2837	25 14 44.4	6.883	12	9 12 11.83	2.1673	17 15 18.5	12.790
13	7 27 30.27	2.2819	25 7 47.3	7.022	13	9 14 21.79	2.1648	17 2 28.0	12.892
14	7 29 47.13	2.2801	25 0 41.8	7.161	14	9 16 31.60	2.1623	16 49 31.5	12.991
15	7 32 3.88	2.2783	24 53 28.0	7.299	15	9 18 41.26	2.1598	16 36 29.1	13.090
16	7 34 20.52	2.2763	24 46 5.9	7.437	16	9 20 50.78	2.1574	16 23 20.7	13.188
17	7 36 37.04	2.2744	24 38 35.6	7.573	17	9 23 0.15	2.1549	16 10 6.5	13.284
18	7 38 53.45	2.2724	24 30 57.1	7.710	18	9 25 9.37	2.1525	15 56 46.6	13.380
19	7 41 9.73	2.2703	24 23 10.4	7.847	19	9 27 18.45	2.1503	15 43 20.9	13.475
20	7 43 25.89	2.2683	24 15 15.5	7.983	20	9 29 27.40	2.1479	15 29 49.6	13.568
21	7 45 41.92	2.2662	24 7 12.5	8.118	21	9 31 36.20	2.1456	15 16 12.8	13.660
22	7 47 57.83	2.2640	23 59 1.4	8.252	22	9 33 44.87	2.1433	15 2 30.4	13.752
23	7 50 13.60	2.2618	23 50 42.3	8.385	23	9 35 53.40	2.1411	14 48 42.6	13.841
24	7 52 29.24	2.2596	N. 23 42 15.2	8.518	24	9 38 1.80	2.1389	N. 14 34 49.5	13.929
FRIDAY 26.					SUNDAY 28.				
0	7 54 44.75	2.2573	N. 23 33 40.1	8.652	0	9 40 10.07	2.1368	N. 14 20 51.1	14.017
1	7 57 0.12	2.2549	23 24 57.0	8.783	1	9 42 18.21	2.1346	14 6 47.5	14.103
2	7 59 15.34	2.2526	23 16 6.1	8.914	2	9 44 26.22	2.1325	13 52 38.7	14.188
3	8 1 30.43	2.2503	23 7 7.3	9.045	3	9 46 34.11	2.1305	13 38 24.9	14.272
4	8 3 45.37	2.2478	22 58 0.7	9.175	4	9 48 41.88	2.1285	13 24 6.1	14.354
5	8 6 0.16	2.2453	22 48 46.3	9.304	5	9 50 49.53	2.1265	13 9 42.4	14.435
6	8 8 14.81	2.2429	22 39 24.2	9.433	6	9 52 57.06	2.1246	12 55 13.9	14.515
7	8 10 29.31	2.2404	22 29 54.4	9.561	7	9 55 4.48	2.1227	12 40 40.6	14.594
8	8 12 43.66	2.2379	22 20 16.9	9.688	8	9 57 11.78	2.1208	12 26 2.6	14.673
9	8 14 57.86	2.2354	22 10 31.8	9.814	9	9 59 18.98	2.1192	12 11 19.9	14.749
10	8 17 11.91	2.2328	22 0 39.2	9.939	10	10 1 26.08	2.1174	11 56 32.7	14.823
11	8 19 25.80	2.2303	21 50 39.1	10.064	11	10 3 33.07	2.1157	11 41 41.1	14.897
12	8 21 39.54	2.2277	21 40 31.5	10.188	12	10 5 39.96	2.1141	11 26 45.1	14.969
13	8 23 53.12	2.2251	21 30 16.5	10.312	13	10 7 46.76	2.1125	11 11 44.8	15.040
14	8 26 6.55	2.2225	21 19 54.1	10.434	14	10 9 53.46	2.1109	10 56 40.3	15.110
15	8 28 19.82	2.2198	21 9 24.4	10.555	15	10 12 0.07	2.1094	10 41 31.6	15.179
16	8 30 32.93	2.2172	20 58 47.5	10.676	16	10 14 6.59	2.1080	10 26 18.8	15.247
17	8 32 45.88	2.2145	20 48 3.3	10.796	17	10 16 13.03	2.1067	10 11 2.0	15.313
18	8 34 58.67	2.2118	20 37 12.0	10.917	18	10 18 19.39	2.1053	9 55 41.4	15.376
19	8 37 11.30	2.2093	20 26 13.6	11.032	19	10 20 25.67	2.1041	9 40 16.9	15.439
20	8 39 23.78	2.2066	20 15 8.2	11.149	20	10 22 31.88	2.1029	9 24 48.7	15.501
21	8 41 36.09	2.2039	20 3 55.7	11.266	21	10 24 38.02	2.1018	9 9 16.8	15.562
22	8 43 48.25	2.2013	19 52 36.3	11.381	22	10 26 44.09	2.1006	8 53 41.3	15.621
23	8 46 0.24	2.1985	19 41 10.0	11.496	23	10 28 50.09	2.0996	8 38 2.3	15.678
24	8 48 12.07	2.1959	N. 19 29 36.8	11.609	24	10 30 56.04	2.0987	N. 8 22 19.9	15.734

PHASES OF THE MOON.

[illegible][illegible]

AT GREENWICH APPARENT NOON.

Day of the Week.	Day of the Month.	THE SUN'S						Sidereal Time of Semidiameter Passing Meridian.	Equation of Time, to be Added to Apparent Time.	Diff. for 1 Hour.
		Apparent Right Ascension.	Diff. for 1 Hour.	Apparent Declination.	Diff. for 1 Hour.	Semidiameter.				
		h m s	s	° ' "	"	' "	s	m s	s	
Mon.	1	22 45 32.75	9.379	S. 7 53 1.2	+56.74	16 10.29	65.47	12 40.60	0.476	
Tues.	2	22 49 17.56	9.357	7 30 16.1	57.02	16 10.05	65.40	12 28.90	0.498	
Wed.	3	22 53 1.87	9.336	7 7 24.5	57.28	16 9.80	65.33	12 16.69	0.519	
Thur.	4	22 56 45.71	9.317	6 44 26.8	+57.53	16 9.55	65.26	12 4.00	0.539	
Fri.	5	23 0 29.08	9.298	6 21 23.3	57.76	16 9.30	65.19	11 50.86	0.557	
Sat.	6	23 4 12.02	9.280	5 58 14.5	57.97	16 9.04	65.13	11 37.28	0.574	
SUN.	7	23 7 54.54	9.263	5 35 0.7	+58.17	16 8.78	65.07	11 23.29	0.591	
Mon.	8	23 11 36.68	9.247	5 11 42.2	58.36	16 8.52	65.01	11 8.91	0.607	
Tues.	9	23 15 18.43	9.232	4 48 19.5	58.53	16 8.26	64.95	10 54.15	0.622	
Wed.	10	23 18 59.84	9.218	4 24 52.9	+58.68	16 8.00	64.89	10 39.04	0.636	
Thur.	11	23 22 40.90	9.205	4 1 22.8	58.82	16 7.73	64.84	10 23.60	0.650	
Fri.	12	23 26 21.65	9.192	3 37 49.7	58.94	16 7.46	64.79	10 7.84	0.663	
Sat.	13	23 30 2.10	9.179	3 14 13.9	+59.04	16 7.19	64.74	9 51.77	0.675	
SUN.	14	23 33 42.26	9.168	2 50 35.9	59.12	16 6.93	64.70	9 35.43	0.686	
Mon.	15	23 37 22.16	9.157	2 26 56.0	59.19	16 6.66	64.66	9 18.82	0.697	
Tues.	16	23 41 1.81	9.147	2 3 14.6	+59.25	16 6.40	64.63	9 1.96	0.707	
Wed.	17	23 44 41.22	9.138	1 39 32.2	59.28	16 6.13	64.60	8 44.87	0.716	
Thur.	18	23 48 20.42	9.129	1 15 49.1	59.30	16 5.86	64.57	8 27.56	0.725	
Fri.	19	23 51 59.42	9.121	0 52 5.8	+59.30	16 5.60	64.54	8 10.05	0.733	
Sat.	20	23 55 38.24	9.114	0 28 22.5	59.29	16 5.33	64.52	7 52.37	0.740	
SUN.	21	23 59 16.90	9.108	S. 0 4 39.7	59.26	16 5.06	64.50	7 34.52	0.746	
Mon.	22	0 2 55.42	9.102	N. 0 19 2.2	+59.22	16 4.79	64.48	7 16.54	0.752	
Tues.	23	0 6 33.82	9.098	0 42 42.9	59.16	16 4.52	64.47	6 58.43	0.757	
Wed.	24	0 10 12.11	9.094	1 6 22.0	59.09	16 4.25	64.46	6 40.22	0.761	
Thur.	25	0 13 50.32	9.091	1 29 59.2	+59.00	16 3.98	64.45	6 21.92	0.764	
Fri.	26	0 17 28.46	9.089	1 53 34.0	58.90	16 3.71	64.44	6 3.56	0.766	
Sat.	27	0 21 6.57	9.087	2 17 6.3	58.78	16 3.43	64.44	5 45.17	0.767	
SUN.	28	0 24 44.66	9.087	2 40 35.5	+58.65	16 3.16	64.44	5 26.75	0.768	
Mon.	29	0 28 22.74	9.088	3 4 1.5	58.51	16 2.89	64.44	5 8.33	0.767	
Tues.	30	0 32 0.85	9.089	3 27 23.9	58.35	16 2.61	64.45	4 49.94	0.765	
Wed.	31	0 35 39.02	9.092	3 50 42.2	58.18	16 2.33	64.46	4 31.60	0.762	
Thur.	32	0 39 17.25	9.096	N. 4 13 56.4	+57.99	16 2.05	64.47	4 13.33	0.759	

NOTE.—The mean time of semidiameter passing the meridian may be found by subtracting 0.18 from the sidereal time.

The sign + prefixed to the hourly change of declination indicates that south declinations are decreasing; north declinations increasing.

AT GREENWICH MEAN NOON.

Day of the Week.	Day of the Month.	THE SUN'S				Equation of Time, to be Subtracted from Mean Time.	Diff. for 1 Hour.	Sidereal Time, or Right Ascension of Mean Sun.
		Apparent Right Ascension.	Diff. for 1 Hour.	Apparent Declination.	Diff. for 1 Hour.			
		h m s	s	° ' "	"	m s	s	h m s
Mon.	1	22 45 30.76	9.380	S. 7 53 13.2	+56.74	12 40.70	0.476	22 32 50.06
Tues.	2	22 49 15.61	9.358	7 30 27.9	57.02	12 29.00	0.498	22 36 46.61
Wed.	3	22 52 59.96	9.338	7 7 36.2	57.28	12 16.80	0.519	22 40 43.17
Thur.	4	22 56 43.83	9.318	6 44 38.4	+57.53	12 4.11	0.539	22 44 39.72
Fri.	5	23 0 27.24	9.300	6 21 34.7	57.76	11 50.97	0.557	22 48 36.28
Sat.	6	23 4 10.22	9.282	5 58 25.7	57.98	11 37.39	0.574	22 52 32.83
SUN.	7	23 7 52.78	9.265	5 35 11.7	+58.18	11 23.40	0.591	22 56 29.38
Mon.	8	23 11 34.96	9.249	5 11 53.0	58.37	11 9.02	0.607	23 0 25.94
Tues.	9	23 15 16.76	9.234	4 48 30.1	58.54	10 54.26	0.622	23 4 22.49
Wed.	10	23 18 58.20	9.220	4 25 3.3	+58.69	10 39.15	0.636	23 8 19.04
Thur.	11	23 22 39.31	9.206	4 1 33.0	58.83	10 23.71	0.650	23 12 15.60
Fri.	12	23 26 20.10	9.193	3 37 59.6	58.95	10 7.95	0.663	23 16 12.15
Sat.	13	23 30 0.59	9.181	3 14 23.6	+59.05	9 51.88	0.675	23 20 8.70
SUN.	14	23 33 40.80	9.170	2 50 45.3	59.14	9 35.54	0.686	23 24 5.26
Mon.	15	23 37 20.74	9.159	2 27 5.2	59.21	9 18.93	0.697	23 28 1.81
Tues.	16	23 41 0.43	9.149	2 3 23.5	+59.26	9 2.07	0.707	23 31 58.37
Wed.	17	23 44 39.89	9.140	1 39 40.8	59.29	8 44.97	0.716	23 35 54.92
Thur.	18	23 48 19.13	9.131	1 15 57.4	59.31	8 27.66	0.725	23 39 51.47
Fri.	19	23 51 58.18	9.123	0 52 13.8	+59.32	8 10.15	0.733	23 43 48.03
Sat.	20	23 55 37.04	9.116	0 28 30.3	59.30	7 52.46	0.740	23 47 44.58
SUN.	21	23 59 15.75	9.110	S. 0 4 47.2	59.27	7 34.62	0.746	23 51 41.13
Mon.	22	0 2 54.32	9.104	N. 0 18 55.0	+59.22	7 16.63	0.752	23 55 37.69
Tues.	23	0 6 32.76	9.100	0 42 36.0	59.16	6 58.52	0.757	23 59 34.24
Wed.	24	0 10 11.10	9.096	1 6 15.4	59.08	6 40.30	0.761	0 3 30.80
Thur.	25	0 13 49.35	9.093	1 29 52.9	+59.00	6 22.00	0.764	0 7 27.35
Fri.	26	0 17 27.55	9.091	1 53 28.1	58.91	6 3.64	0.766	0 11 23.90
Sat.	27	0 21 5.70	9.090	2 17 0.6	58.79	5 45.24	0.767	0 15 20.46
SUN.	28	0 24 43.83	9.089	2 40 30.2	+58.66	5 26.82	0.768	0 19 17.01
Mon.	29	0 28 21.96	9.090	3 3 56.5	58.52	5 8.40	0.767	0 23 13.56
Tues.	30	0 32 0.12	9.091	3 27 19.2	58.36	4 50.00	0.765	0 27 10.12
Wed.	31	0 35 38.33	9.094	3 50 37.8	58.19	4 31.66	0.762	0 31 6.67
Thur.	32	0 39 16.61	9.097	N. 4 13 52.3	+58.01	4 13.39	0.759	0 35 3.22

NOTE.—The semidiameter for mean noon may be assumed the same as that for apparent noon.
 The sign + prefixed to the hourly change of declination indicates that south declinations are decreasing; north declinations, increasing.

Diff. for 1 Hour,
 +9.856s.
 (Table III.)

AT GREENWICH MEAN NOON.

Day of the Month.	Day of the Year.	THE SUN'S					Logarithm of the Radius Vector of the Earth.	Diff. for 1 Hour.	Mean Time of Sidereal Noon.
		True Longitude.		Diff. for 1 Hour.	Latitude.				
		λ	λ'						
		° ' "	° ' "	"	"				h m s
1	60	339 50 14.0	49 55.5	150.48	-0.03	9.996 0493	+44.8		1 26 55.66
2	61	340 50 24.5	50 5.8	150.40	0.16	9.996 1576	45.6		1 22 59.75
3	62	341 50 33.2	50 14.4	150.33	0.28	9.996 2676	46.3		1 19 3.84
4	63	342 50 40.2	50 21.3	150.26	-0.38	9.996 3793	+46.9		1 15 7.94
5	64	343 50 45.5	50 26.5	150.19	0.45	9.996 4926	47.4		1 11 12.03
6	65	344 50 49.2	50 30.1	150.12	0.49	9.996 6073	48.0		1 7 16.12
7	66	345 50 51.4	50 32.2	150.06	-0.50	9.996 7232	+48.5		1 3 20.21
8	67	346 50 52.0	50 32.6	149.99	0.47	9.996 8402	48.9		0 59 24.30
9	68	347 50 51.0	50 31.5	149.92	0.41	9.996 9582	49.3		0 55 28.40
10	69	348 50 48.4	50 28.8	149.85	-0.33	9.997 0768	+49.5		0 51 32.49
11	70	349 50 44.1	50 24.4	149.78	0.21	9.997 1960	49.7		0 47 36.58
12	71	350 50 38.1	50 18.3	149.71	-0.08	9.997 3156	49.9		0 43 40.67
13	72	351 50 30.4	50 10.5	149.64	+0.06	9.997 4354	+50.0		0 39 44.76
14	73	352 50 20.8	50 0.8	149.56	0.19	9.997 5555	50.0		0 35 48.86
15	74	553 50 9.4	49 49.3	149.48	0.32	9.997 6757	50.1		0 31 52.95
16	75	354 49 56.0	49 35.8	149.40	+0.44	9.997 7959	+50.1		0 27 57.04
17	76	355 49 40.5	49 20.2	149.31	0.54	9.997 9161	50.1		0 24 1.14
18	77	356 49 23.0	49 2.6	149.22	0.61	9.998 0364	50.1		0 20 5.23
19	78	357 49 3.3	48 42.8	149.13	+0.66	9.998 1568	+50.2		0 16 9.32
20	79	358 48 41.4	48 20.8	149.04	0.69	9.998 2772	50.2		0 12 13.41
21	80	359 48 17.3	47 56.6	148.95	0.68	9.998 3978	50.3		0 8 17.50
22	81	0 47 51.0	47 30.1	148.86	+0.65	9.998 5186	+50.4		0 4 21.60
23	82	1 47 22.3	47 1.4	148.76	0.60	9.998 6395	50.5	{	0 0 25.69
24	83	2 46 51.4	46 30.3	148.67	0.52	9.998 7608	50.6		23 56 29.78
									23 52 33.87
25	84	3 46 18.1	45 56.9	148.57	+0.41	9.998 8823	+50.7		23 48 37.96
26	85	4 45 42.5	45 21.2	148.47	0.30	9.999 0043	50.9		23 44 42.06
27	86	5 45 4.7	44 43.3	148.37	0.18	9.999 1269	51.2		23 40 46.15
28	87	6 44 24.5	44 3.0	148.28	+0.05	9.999 2500	+51.4		23 36 50.24
29	88	7 43 42.2	43 20.5	148.19	-0.08	9.999 3738	51.7		23 32 54.33
30	89	8 42 57.6	42 35.9	148.10	0.20	9.999 4983	52.0		23 28 58.42
31	90	9 42 11.0	41 49.1	148.01	0.30	9.999 6236	52.3		23 25 2.52
32	91	10 41 22.3	41 0.3	147.93	-0.37	9.999 7495	+52.6		23 21 6.61

NOTE.—The longitudes in the column λ are referred to the true equinox of their own date, while those in the column λ' are referred to the mean equinox of the beginning of the Besselian fictitious year.

Diff. for 1 Hour,
— $g^{\circ} 8496$.
(Table II.)

GREENWICH MEAN TIME.

Day of the Month.	THE MOON'S								
	SEMI- DIAMETER.		HORIZONTAL PARALLAX.				UPPER TRANSIT.		AGE.
	Noon.	Midnight.	Noon.	Diff. for 1 Hour.	Midnight.	Diff. for 1 Hour.	Meridian of Greenwich.	Diff. for 1 Hour.	Noon.
	' "	' "	' "	"	' "	"	h m	m	d
1	15 59.9	16 4.7	58 37.05	+1.561	58 54.78	+1.388	12 22.0	1.99	15.3
2	16 9.0	16 12.5	59 10.27	1.190	59 23.26	0.972	13 9.9	2.01	16.3
3	16 15.3	16 17.4	59 33.56	0.743	59 41.06	0.507	13 58 9	2.08	17.3
4	16 18.6	16 19.2	59 45.75	+0.276	59 47.72	+0.055	14 50.2	2.20	18.3
5	16 19.0	16 18.2	59 47.12	-0.151	59 44.16	-0.339	15 44.7	2.34	19.3
6	16 16.8	16 14.9	59 39.09	0.504	59 32.17	0.646	16 42.7	2.49	20.3
7	16 12.6	16 10.0	59 23.69	-0.763	59 13.92	-0.861	17 43.6	2.57	21.3
8	16 7.0	16 3.8	59 3.09	0.941	58 51.41	1.003	18 45.4	2.56	22.3
9	16 0.5	15 56.9	58 39.06	1.053	58 26.18	1.092	19 45.9	2.45	23.3
10	15 53.3	15 49.6	58 12.90	-1.121	57 59.29	-1.147	20 42.9	2.28	24.3
11	15 45.8	15 42.0	57 45.40	1.168	57 31.27	1.187	21 35.5	2.10	25.3
12	15 38.1	15 34.1	57 16.92	1.205	57 2.38	1.219	22 24.1	1.95	26.3
13	15 30.1	15 26.1	56 47.70	-1.229	56 32.92	-1.234	23 9.2	1.82	27.3
14	15 22.0	15 18.0	56 18.10	1.234	56 3.33	1.226	23 52.1	1.75	28.3
15	15 14.0	15 10.1	55 48.72	1.207	55 34.40	1.176	6	.	29.3
16	15 6.4	15 2.8	55 20.54	-1.131	55 7.30	-1.073	0 33.7	1.73	0.7
17	14 59.4	14 56.2	54 54.86	0.998	54 43.41	0.907	1 15.3	1.74	1.7
18	14 53.4	14 51.0	54 33.16	0.798	54 24.32	0.673	1 57.6	1.79	2.7
19	14 49.1	14 47.6	54 17.09	-0.530	54 11.66	-0.372	2 41.6	1.88	3.7
20	14 46.6	14 46.3	54 8.20	-0.202	54 6.87	-0.018	3 27.7	1.97	4.7
21	14 46.6	14 47.5	54 7.82	+0.178	54 11.17	+0.382	4 16.1	2.07	5.7
22	14 49.0	14 51.3	54 17.00	+0.591	54 25.38	+0.806	5 6.7	2.14	6.7
23	14 54.3	14 58.0	54 36.34	1.021	54 49.86	1.231	5 58.6	2.18	7.7
24	15 2.4	15 7.4	55 5.87	1.435	55 24.25	1.627	6 50.8	2.17	8.7
25	15 13.0	15 19.1	55 44.84	+1.803	56 7.42	+1.957	7 42.4	2.13	9.7
26	15 25.8	15 32.7	56 31.70	2.085	56 57.33	2.180	8 32.7	2.07	10.7
27	15 40.0	15 47.3	57 23.88	2.237	57 50.85	2.251	9 21.7	2.02	11.7
28	15 54.6	16 1.8	58 17.70	+2.217	58 43.86	+2.134	10 9.9	2.00	12.7
29	16 8.5	16 14.8	59 8.72	2.000	59 31.65	1.813	10 57.9	2.02	13.7
30	16 20.4	16 25.1	59 52.05	1.579	60 9.38	1.303	11 47.1	2.09	14.7
31	16 28.8	16 31.6	60 23.21	0.997	60 33.22	+0.669	12 38.6	2.21	15.7
32	16 33.2	16 33.7	60 39.21	+0.329	60 41.11	-0.011	13 33.5	2.37	16.7

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
MONDAY 1.					WEDNESDAY 3.				
0	h m s	s	"	"	0	h m s	s	"	"
1	10 30 56.04	2.0987	N. 8 22 19.9	15.734	1	12 11 49.92	2.1334	S. 4 49 37.2	16.665
2	10 33 1.93	2.0978	8 6 34.2	15.789	2	12 13 58.00	2.1360	5 6 16.5	16.645
3	10 35 7.77	2.0969	7 50 45.2	15.843	3	12 16 6.24	2.1387	5 22 54.6	16.624
4	10 37 13.56	2.0961	7 34 53.0	15.895	4	12 18 14.64	2.1414	5 39 31.4	16.601
5	10 39 19.30	2.0953	7 18 57.8	15.945	5	12 20 23.21	2.1442	5 56 6.7	16.575
6	10 41 25.00	2.0947	7 2 59.6	15.994	6	12 22 31.94	2.1470	6 12 40.4	16.548
7	10 43 30.66	2.0941	6 46 58.5	16.043	7	12 24 40.85	2.1499	6 29 12.5	16.520
8	10 45 36.29	2.0936	6 30 54.5	16.089	8	12 26 49.93	2.1529	6 45 42.8	16.490
9	10 47 41.89	2.0931	6 14 47.8	16.133	9	12 28 59.20	2.1561	7 2 11.3	16.459
10	10 49 47.46	2.0927	5 58 38.5	16.176	10	12 31 8.66	2.1593	7 18 37.9	16.426
11	10 51 53.01	2.0923	5 42 26.7	16.218	11	12 33 18.31	2.1624	7 35 2.4	16.390
12	10 53 58.54	2.0921	5 26 12.3	16.259	12	12 35 28.15	2.1658	7 51 24.7	16.353
13	10 56 4.06	2.0919	5 9 55.6	16.298	13	12 37 38.20	2.1692	8 7 44.7	16.313
14	10 58 9.57	2.0918	4 53 36.6	16.335	14	12 39 48.45	2.1726	8 24 2.3	16.273
15	11 0 15.08	2.0918	4 37 15.4	16.371	15	12 41 58.91	2.1762	8 40 17.5	16.232
16	11 2 20.58	2.0917	4 20 52.1	16.406	16	12 44 9.59	2.1798	8 56 30.1	16.188
17	11 4 26.08	2.0918	4 4 26.7	16.439	17	12 46 20.48	2.1834	9 12 40.0	16.142
18	11 6 31.59	2.0919	3 47 59.4	16.470	18	12 48 31.60	2.1872	9 28 47.1	16.094
19	11 8 37.11	2.0922	3 31 30.3	16.500	19	12 50 42.94	2.1909	9 44 51.3	16.045
20	11 10 42.65	2.0925	3 14 59.4	16.529	20	12 52 54.51	2.1948	10 0 52.5	15.994
21	11 12 48.21	2.0928	2 58 26.8	16.556	21	12 55 6.32	2.1988	10 16 50.6	15.941
22	11 14 53.79	2.0933	2 41 52.7	16.581	22	12 57 18.36	2.2028	10 32 45.4	15.886
23	11 16 59.40	2.0938	2 25 17.1	16.606	23	12 59 30.65	2.2068	10 48 36.9	15.830
24	11 19 5.04	2.0943	N. 2 8 40.0	16.628	24	13 1 43.18	2.2110	S. 11 4 25.0	15.773
TUESDAY 2.					THURSDAY 4.				
0	h m s	s	"	"	0	h m s	s	"	"
1	11 21 10.72	2.0950	N. 1 52 1.7	16.648	1	13 3 55.97	2.2153	S. 11 20 9.6	15.713
2	11 23 16.44	2.0958	1 35 22.2	16.668	2	13 6 9.01	2.2195	11 35 50.5	15.651
3	11 25 22.21	2.0966	1 18 41.6	16.685	3	13 8 22.31	2.2238	11 51 27.7	15.588
4	11 27 28.03	2.0974	1 2 0.0	16.701	4	13 10 35.87	2.2283	12 7 1.0	15.523
5	11 29 33.90	2.0983	0 45 17.5	16.716	5	13 12 49.70	2.2328	12 22 30.4	15.456
6	11 31 39.83	2.0994	0 28 34.1	16.729	6	13 15 3.80	2.2373	12 37 55.7	15.387
7	11 33 45.83	2.1005	N. 0 11 50.0	16.741	7	13 17 18.18	2.2419	12 53 16.8	15.316
8	11 35 51.89	2.1017	S. 0 4 54.8	16.750	8	13 19 32.83	2.2465	13 8 33.6	15.244
9	11 37 58.03	2.1029	0 21 40.0	16.758	9	13 21 47.76	2.2512	13 23 46.1	15.171
10	11 40 4.24	2.1043	0 38 25.7	16.764	10	13 24 2.97	2.2559	13 38 54.1	15.094
11	11 42 10.54	2.1057	0 55 11.7	16.769	11	13 26 18.47	2.2608	13 53 57.4	15.017
12	11 44 16.92	2.1072	1 11 58.0	16.773	12	13 28 34.26	2.2656	14 8 56.1	14.938
13	11 46 23.40	2.1088	1 28 44.4	16.774	13	13 30 50.34	2.2705	14 23 49.9	14.856
14	11 48 29.97	2.1103	1 45 30.9	16.774	14	13 33 6.72	2.2755	14 38 38.8	14.773
15	11 50 36.64	2.1121	2 2 17.3	16.773	15	13 35 23.40	2.2805	14 53 22.7	14.688
16	11 52 43.42	2.1139	2 19 3.6	16.769	16	13 37 40.38	2.2855	15 8 1.4	14.603
17	11 54 50.31	2.1158	2 35 49.6	16.764	17	13 39 57.66	2.2906	15 22 34.9	14.514
18	11 56 57.31	2.1177	2 52 35.3	16.758	18	13 42 15.25	2.2958	15 37 3.1	14.424
19	11 59 4.43	2.1198	3 9 20.5	16.749	19	13 44 33.15	2.3010	15 51 25.8	14.332
20	12 1 11.68	2.1218	3 26 5.2	16.740	20	13 46 51.37	2.3063	16 5 42.9	14.238
21	12 3 19.05	2.1240	3 42 49.3	16.728	21	13 49 9.90	2.3115	16 19 54.4	14.143
22	12 5 26.56	2.1263	3 59 32.6	16.715	22	13 51 28.75	2.3168	16 34 0.1	14.047
23	12 7 34.20	2.1286	4 16 15.1	16.701	23	13 53 47.92	2.3222	16 48 0.0	13.948
24	12 9 41.99	2.1310	4 32 56.7	16.684	24	13 56 7.41	2.3275	17 1 53.8	13.847
	12 11 49.92	2.1334	S. 4 49 37.2	16.665		13 58 27.22	2.3329	S. 17 15 41.6	13.744

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
FRIDAY 5.					SUNDAY 7.				
	h m s	s	° ' "	"		h m s	s	° ' "	"
0	13 58 27.22	2.3329	S. 17 15 41.6	13.744	0	15 56 42.58	2.5820	S. 25 46 7.3	6.948
1	14 0 47.36	2.3384	17 29 23.1	13.640	1	15 59 17.62	2.5858	25 52 58.9	6.773
2	14 3 7.83	2.3439	17 42 58.4	13.535	2	16 1 52.88	2.5894	25 59 40.1	6.598
3	14 5 28.63	2.3494	17 56 27.3	13.427	3	16 4 28.35	2.5930	26 6 10.7	6.422
4	14 7 49.76	2.3549	18 9 49.6	13.318	4	16 7 4.04	2.5965	26 12 30.7	6.244
5	14 10 11.22	2.3604	18 23 5.4	13.208	5	16 9 39.93	2.5998	26 18 40.0	6.066
6	14 12 33.01	2.3660	18 36 14.5	13.094	6	16 12 16.02	2.6030	26 24 38.6	5.887
7	14 14 55.14	2.3716	18 49 16.7	12.979	7	16 14 52.29	2.6061	26 30 26.4	5.706
8	14 17 17.60	2.3772	19 2 12.0	12.863	8	16 17 28.75	2.6092	26 36 3.3	5.525
9	14 19 40.40	2.3828	19 15 0.3	12.746	9	16 20 5.39	2.6122	26 41 29.4	5.345
10	14 22 3.54	2.3885	19 27 41.5	12.627	10	16 22 42.19	2.6147	26 46 44.7	5.163
11	14 24 27.02	2.3941	19 40 15.5	12.505	11	16 25 19.15	2.6173	26 51 49.0	4.979
12	14 26 50.83	2.3997	19 52 42.1	12.382	12	16 27 56.27	2.6198	26 56 42.2	4.795
13	14 29 14.98	2.4053	20 5 1.3	12.258	13	16 30 33.53	2.6222	27 1 24.4	4.612
14	14 31 39.47	2.4110	20 17 13.0	12.131	14	16 33 10.93	2.6243	27 5 55.6	4.428
15	14 34 4.30	2.4166	20 29 17.0	12.003	15	16 35 48.45	2.6263	27 10 15.7	4.242
16	14 36 29.46	2.4222	20 41 13.3	11.873	16	16 38 26.09	2.6282	27 14 24.6	4.055
17	14 38 54.96	2.4278	20 53 1.8	11.742	17	16 41 3.84	2.6301	27 18 22.3	3.869
18	14 41 20.80	2.4334	21 4 42.3	11.608	18	16 43 41.70	2.6318	27 22 8.9	3.683
19	14 43 46.97	2.4390	21 16 14.8	11.475	19	16 46 19.65	2.6332	27 25 44.2	3.495
20	14 46 13.48	2.4446	21 27 39.3	11.339	20	16 48 57.68	2.6344	27 29 8.3	3.308
21	14 48 40.32	2.4502	21 38 55.5	11.201	21	16 51 35.78	2.6356	27 32 21.2	3.120
22	14 51 7.50	2.4558	21 50 3.4	11.062	22	16 54 13.95	2.6367	27 35 22.7	2.932
23	14 53 35.01	2.4612	S. 22 1 2.9	10.922	23	16 56 52.18	2.6376	S. 27 38 13.0	2.743
SATURDAY 6.					MONDAY 8.				
	h m s	s	° ' "	"		h m s	s	° ' "	"
0	14 56 2.84	2.4667	S. 22 11 54.0	10.779	0	16 59 30.46	2.6383	S. 27 40 51.9	2.554
1	14 58 31.01	2.4722	22 22 36.4	10.635	1	17 2 8.78	2.6388	27 43 19.5	2.366
2	15 0 59.50	2.4775	22 33 10.2	10.490	2	17 4 47.12	2.6393	27 45 35.8	2.177
3	15 3 28.31	2.4829	22 43 35.2	10.343	3	17 7 25.49	2.6396	27 47 40.7	1.988
4	15 5 57.45	2.4883	22 53 51.4	10.195	4	17 10 3.87	2.6397	27 49 34.3	1.798
5	15 8 26.91	2.4936	23 3 58.6	10.045	5	17 12 42.25	2.6396	27 51 16.5	1.608
6	15 10 56.68	2.4988	23 13 56.8	9.893	6	17 15 20.92	2.6393	27 52 47.3	1.419
7	15 13 26.77	2.5041	23 23 45.8	9.740	7	17 17 58.97	2.6390	27 54 6.8	1.231
8	15 15 57.17	2.5092	23 33 25.6	9.587	8	17 20 37.30	2.6386	27 55 15.0	1.043
9	15 18 27.87	2.5143	23 42 56.2	9.432	9	17 23 15.60	2.6379	27 56 11.8	0.853
10	15 20 58.88	2.5193	23 52 17.4	9.275	10	17 25 53.85	2.6371	27 56 57.3	0.664
11	15 23 30.19	2.5243	24 1 29.2	9.117	11	17 28 32.05	2.6361	27 57 31.5	0.475
12	15 26 1.79	2.5292	24 10 31.4	8.957	12	17 31 10.18	2.6349	27 57 54.3	0.286
13	15 28 33.60	2.5341	24 19 24.0	8.796	13	17 33 48.24	2.6337	27 58 5.8	-0.098
14	15 31 5.88	2.5388	24 28 6.9	8.634	14	17 36 26.22	2.6322	27 58 6.1	+0.089
15	15 33 38.35	2.5435	24 36 40.1	8.471	15	17 39 4.10	2.6305	27 57 55.1	0.278
16	15 36 11.10	2.5482	24 45 3.4	8.306	16	17 41 41.88	2.6288	27 57 32.8	0.464
17	15 38 44.13	2.5527	24 53 16.8	8.140	17	17 44 19.55	2.6269	27 56 59.4	0.651
18	15 41 17.42	2.5572	25 1 20.2	7.973	18	17 46 57.11	2.6248	27 56 14.7	0.838
19	15 43 50.99	2.5616	25 9 13.6	7.806	19	17 49 34.53	2.6226	27 55 18.9	1.023
20	15 46 24.81	2.5658	25 16 56.9	7.636	20	17 52 11.82	2.6203	27 54 11.9	1.209
21	15 48 58.88	2.5700	25 24 29.9	7.465	21	17 54 48.96	2.6178	27 52 53.8	1.393
22	15 51 33.21	2.5742	25 31 52.7	7.294	22	17 57 25.95	2.6151	27 51 24.7	1.578
23	15 54 7.78	2.5781	25 39 5.2	7.122	23	18 0 2.77	2.6122	27 49 44.5	1.762
24	15 56 42.58	2.5820	S. 25 46 7.3	6.948	24	18 2 39.42	2.6093	S. 27 47 53.3	1.944

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
TUESDAY 9.					THURSDAY 11.				
	h m s	s	° ' "	"		h m s	s	° ' "	"
0	18 2 39.42	2.6093	S. 27 47 53.3	1.944	0	20 2 18.37	2.3459	S. 23 2 30.1	9.467
1	18 5 15.89	2.6062	27 45 51.2	2.127	1	20 4 38.86	2.3381	22 52 58.4	9.589
2	18 7 52.16	2.6028	27 43 38.1	2.309	2	20 6 58.94	2.3312	22 43 19.4	9.711
3	18 10 28.23	2.5995	27 41 14.1	2.490	3	20 9 18.60	2.3243	22 33 33.1	9.831
4	18 13 4.10	2.5960	27 38 39.3	2.670	4	20 11 37.85	2.3173	22 23 39.7	9.949
5	18 15 39.75	2.5923	27 35 53.7	2.849	5	20 13 56.68	2.3104	22 13 39.2	10.066
6	18 18 15.19	2.5885	27 32 57.4	3.028	6	20 16 15.10	2.3036	22 3 31.8	10.181
7	18 20 50.39	2.5847	27 29 50.4	3.205	7	20 18 33.11	2.2967	21 53 17.5	10.295
8	18 23 25.35	2.5807	27 26 32.8	3.382	8	20 20 50.70	2.2898	21 42 56.4	10.408
9	18 26 0.07	2.5765	27 23 4.6	3.558	9	20 23 7.88	2.2828	21 32 28.6	10.518
10	18 28 34.53	2.5722	27 19 25.9	3.733	10	20 25 24.64	2.2759	21 21 54.2	10.628
11	18 31 8.73	2.5678	27 15 36.7	3.907	11	20 27 40.99	2.2691	21 11 13.3	10.736
12	18 33 42.66	2.5633	27 11 37.1	4.079	12	20 29 56.93	2.2623	21 0 25.9	10.841
13	18 36 16.32	2.5586	27 7 27.2	4.251	13	20 32 12.46	2.2554	20 49 32.3	10.946
14	18 38 49.69	2.5538	27 3 7.0	4.422	14	20 34 27.58	2.2486	20 38 32.4	11.049
15	18 41 22.77	2.5489	26 58 36.6	4.592	15	20 36 42.29	2.2418	20 27 26.4	11.150
16	18 43 55.56	2.5439	26 53 56.0	4.761	16	20 38 56.59	2.2349	20 16 14.4	11.250
17	18 46 28.04	2.5388	26 49 5.3	4.928	17	20 41 10.48	2.2282	20 4 56.4	11.349
18	18 49 0.22	2.5337	26 44 4.6	5.094	18	20 43 23.97	2.2215	19 53 32.5	11.447
19	18 51 32.08	2.5283	26 38 54.0	5.259	19	20 45 37.06	2.2148	19 42 2.8	11.542
20	18 54 3.62	2.5230	26 33 33.5	5.423	20	20 47 49.75	2.2082	19 30 27.5	11.635
21	18 56 34.84	2.5175	26 28 3.2	5.586	21	20 50 2.04	2.2015	19 18 46.6	11.728
22	18 59 5.72	2.5119	26 22 23.2	5.748	22	20 52 13.93	2.1949	19 7 0.2	11.819
23	19 1 36.27	2.5063	S. 26 16 33.5	5.908	23	20 54 25.43	2.1883	S. 18 55 8.3	11.909
WEDNESDAY 10.					FRIDAY 12.				
	h m s	s	° ' "	"		h m s	s	° ' "	"
0	19 4 6.47	2.5005	S. 26 10 34.2	6.068	0	20 56 36.53	2.1818	S. 18 43 11.1	11.997
1	19 6 36.33	2.4947	26 4 25.4	6.225	1	20 58 47.24	2.1753	18 31 8.7	12.083
2	19 9 5.83	2.4888	25 58 7.2	6.381	2	21 0 57.56	2.1688	18 19 1.2	12.168
3	19 11 34.98	2.4828	25 51 39.7	6.536	3	21 3 7.50	2.1625	18 6 48.6	12.251
4	19 14 3.76	2.4767	25 45 2.9	6.690	4	21 5 17.06	2.1562	17 54 31.1	12.333
5	19 16 32.18	2.4706	25 38 16.9	6.843	5	21 7 26.24	2.1498	17 42 8.7	12.413
6	19 19 0.23	2.4644	25 31 21.8	6.994	6	21 9 35.04	2.1435	17 29 41.6	12.492
7	19 21 27.91	2.4582	25 24 17.6	7.144	7	21 11 43.46	2.1373	17 17 9.7	12.570
8	19 23 55.21	2.4518	25 17 4.5	7.292	8	21 13 51.51	2.1311	17 4 33.2	12.646
9	19 26 22.13	2.4455	25 9 42.6	7.438	9	21 15 59.19	2.1249	16 51 52.2	12.720
10	19 28 48.67	2.4391	25 2 11.9	7.584	10	21 18 6.50	2.1188	16 39 6.8	12.793
11	19 31 14.82	2.4325	24 54 32.5	7.728	11	21 20 13.45	2.1128	16 26 17.0	12.865
12	19 33 40.57	2.4259	24 46 44.5	7.871	12	21 22 20.04	2.1068	16 13 23.0	12.935
13	19 36 5.93	2.4194	24 38 48.0	8.012	13	21 24 26.27	2.1009	16 0 24.8	13.004
14	19 38 30.90	2.4128	24 30 43.1	8.152	14	21 26 32.15	2.0951	15 47 22.5	13.072
15	19 40 55.47	2.4061	24 22 29.8	8.290	15	21 28 37.68	2.0893	15 34 16.2	13.138
16	19 43 19.64	2.3995	24 14 8.3	8.427	16	21 30 42.86	2.0835	15 21 6.0	13.202
17	19 45 43.41	2.3928	24 5 38.6	8.562	17	21 32 47.70	2.0778	15 7 52.0	13.265
18	19 48 6.77	2.3860	23 57 0.9	8.695	18	21 34 52.20	2.0723	14 54 34.2	13.327
19	19 50 29.73	2.3793	23 48 15.2	8.828	19	21 36 56.37	2.0667	14 41 12.8	13.387
20	19 52 52.28	2.3724	23 39 21.6	8.958	20	21 39 0.20	2.0611	14 27 47.8	13.446
21	19 55 14.42	2.3656	23 30 20.2	9.088	21	21 41 3.70	2.0556	14 14 19.3	13.504
22	19 57 36.15	2.3587	23 21 11.1	9.215	22	21 43 6.87	2.0502	14 0 47.3	13.561
23	19 59 57.46	2.3518	23 11 54.4	9.342	23	21 45 9.72	2.0449	13 47 12.0	13.616
24	20 2 18.37	2.3450	S. 23 2 30.1	9.467	24	21 47 12.26	2.0397	S. 13 33 33.4	13.669

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.			Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.			Diff. for 1 Min.	Declination.	Diff. for 1 Min.				
SATURDAY 13.							MONDAY 15.										
	h	m	s	s	°	'	''		h	m	s	s	°	'	''	''	
0	21	47	12.26	2.0397	S.	13	33 33.4	13.669	0	23	20	19.64	1.8677	S.	1	59 25.3	14.808
1	21	49	14.48	2.0344		13	19 51.7	13.721	1	23	22	11.64	1.8658		1	44 36.9	14.804
2	21	51	16.39	2.0293		13	6 6.9	13.773	2	23	24	3.53	1.8640		1	29 48.8	14.800
3	21	53	17.99	2.0242		12	52 19.0	13.823	3	23	25	55.32	1.8623		1	15 0.9	14.795
4	21	55	19.29	2.0192		12	38 28.2	13.870	4	23	27	47.01	1.8607		1	0 13.4	14.788
5	21	57	20.29	2.0143		12	24 34.6	13.917	5	23	29	38.60	1.8591		0	45 26.3	14.782
6	21	59	21.00	2.0094		12	10 38.2	13.963	6	23	31	30.10	1.8576		0	30 39.6	14.773
7	22	1	21.42	2.0045		11	56 39.1	14.008	7	23	33	21.51	1.8562		0	15 53.5	14.763
8	22	3	21.54	1.9998		11	42 37.3	14.051	8	23	35	12.84	1.8548	S.	0	1 8.0	14.753
9	22	5	21.39	1.9952		11	28 33.0	14.093	9	23	37	4.09	1.8536	N.	0	13 36.9	14.743
10	22	7	20.96	1.9905		11	14 26.2	14.133	10	23	38	55.27	1.8527		0	28 21.1	14.731
11	22	9	20.25	1.9859		11	0 17.1	14.172	11	23	40	46.37	1.8512		0	43 4.6	14.718
12	22	11	19.27	1.9815		10	46 5.6	14.211	12	23	42	37.41	1.8501		0	57 47.2	14.703
13	22	13	18.03	1.9771		10	31 51.8	14.248	13	23	44	28.38	1.8491		1	12 29.0	14.688
14	22	15	16.52	1.9728		10	17 35.9	14.283	14	23	46	19.30	1.8482		1	27 9.8	14.673
15	22	17	14.76	1.9685		10	3 17.9	14.317	15	23	48	10.16	1.8473		1	41 49.7	14.656
16	22	19	12.74	1.9643		9	48 57.9	14.350	16	23	50	0.97	1.8465		1	56 28.5	14.638
17	22	21	10.48	1.9603		9	34 35.9	14.383	17	23	51	51.74	1.8458		2	11 6.2	14.619
18	22	23	7.97	1.9561		9	20 12.0	14.413	18	23	53	42.46	1.8451		2	25 42.8	14.600
19	22	25	5.21	1.9521		9	5 46.4	14.442	19	23	55	33.15	1.8445		2	40 18.2	14.579
20	22	27	2.22	1.9483		8	51 19.0	14.471	20	23	57	23.80	1.8439		2	54 52.3	14.558
21	22	28	59.00	1.9444		8	36 49.9	14.498	21	23	59	14.42	1.8434		3	9 25.1	14.535
22	22	30	55.55	1.9406		8	22 19.2	14.524	22	0	1	5.01	1.8430		3	23 56.5	14.512
23	22	32	51.87	1.9368	S.	8	7 47.0	14.548	23	0	2	55.58	1.8427	N.	3	38 26.5	14.488
SUNDAY 14.							TUESDAY 16.										
0	22	34	47.97	1.9333	S.	7	53 13.4	14.572	0	0	4	46.13	1.8424	N.	3	52 55.1	14.463
1	22	36	43.86	1.9297		7	38 38.4	14.595	1	0	6	36.67	1.8423		4	7 22.1	14.438
2	22	38	39.53	1.9262		7	24 2.0	14.617	2	0	8	27.20	1.8421		4	21 47.6	14.411
3	22	40	35.00	1.9228		7	9 24.4	14.636	3	0	10	17.72	1.8419		4	36 11.4	14.383
4	22	42	30.26	1.9194		6	54 45.7	14.655	4	0	12	8.23	1.8419		4	50 33.6	14.355
5	22	44	25.33	1.9162		6	40 5.8	14.673	5	0	13	58.75	1.8421		5	4 54.0	14.325
6	22	46	20.20	1.9130		6	25 24.9	14.690	6	0	15	49.28	1.8422		5	19 12.6	14.295
7	22	48	14.89	1.9099		6	10 43.0	14.706	7	0	17	39.81	1.8423		5	33 29.4	14.264
8	22	50	9.39	1.9068		5	56 0.2	14.720	8	0	19	30.35	1.8425		5	47 44.3	14.233
9	22	52	3.71	1.9038		5	41 16.6	14.733	9	0	21	20.91	1.8428		6	1 57.3	14.199
10	22	53	57.85	1.9008		5	26 32.2	14.746	10	0	23	11.49	1.8432		6	16 8.2	14.165
11	22	55	51.81	1.8980		5	11 47.1	14.757	11	0	25	2.09	1.8437		6	30 17.1	14.131
12	22	57	45.61	1.8953		4	57 1.4	14.767	12	0	26	52.73	1.8442		6	44 23.9	14.096
13	22	59	39.24	1.8926		4	42 15.1	14.777	13	0	28	43.39	1.8447		6	58 28.6	14.059
14	23	1	32.72	1.8900		4	27 28.2	14.785	14	0	30	34.09	1.8453		7	12 31.0	14.022
15	23	3	26.04	1.8874		4	12 40.9	14.792	15	0	32	24.83	1.8460		7	26 31.2	13.984
16	23	5	19.21	1.8849		3	57 53.2	14.798	16	0	34	15.61	1.8468		7	40 29.1	13.945
17	23	7	12.23	1.8825		3	43 5.2	14.802	17	0	36	6.44	1.8476		7	54 24.6	13.903
18	23	9	5.11	1.8802		3	28 17.0	14.806	18	0	37	57.32	1.8484		8	8 17.7	13.865
19	23	10	57.85	1.8779		3	13 28.5	14.809	19	0	39	48.25	1.8493		8	22 8.4	13.824
20	23	12	50.46	1.8758		2	58 39.9	14.811	20	0	41	39.23	1.8503		8	35 56.6	13.782
21	23	14	42.94	1.8737		2	43 51.2	14.812	21	0	43	30.28	1.8513		8	49 42.2	13.738
22	23	16	35.29	1.8715		2	29 2.5	14.812	22	0	45	21.39	1.8524		9	3 25.2	13.695
23	23	18	27.52	1.8696		2	14 13.8	14.810	23	0	47	12.57	1.8536		9	17 5.6	13.650
24	23	20	19.64	1.8677	S.	1	59 25.3	14.808	24	0	49	3.82	1.8548	N.	9	30 43.2	13.604

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
WEDNESDAY 17.					FRIDAY 19.				
0	h m s	s	° ' "	"	0	h m s	s	° ' "	"
0	49 3.82	1.8548	N. 9 30 43.2	13.604	0	2 20 28.74	1.9715	N. 19 16 4.1	10.482
1	50 55.15	1.8561	9 44 18.1	13.558	1	2 22 27.13	1.9749	19 26 30.5	10.398
2	52 46.55	1.8574	9 57 50.2	13.511	2	2 24 25.73	1.9784	19 36 51.9	10.313
3	54 38.04	1.8588	10 11 19.4	13.463	3	2 26 24.54	1.9818	19 47 8.1	10.228
4	56 29.61	1.8603	10 24 45.7	13.414	4	2 28 23.55	1.9853	19 57 19.2	10.141
5	58 21.27	1.8618	10 38 9.1	13.365	5	2 30 22.77	1.9888	20 7 25.0	10.053
6	1 0 13.02	1.8633	10 51 29.5	13.314	6	2 32 22.21	1.9924	20 17 25.6	9.966
7	1 2 4.86	1.8648	11 4 46.8	13.263	7	2 34 21.86	1.9959	20 27 20.9	9.878
8	1 3 56.80	1.8665	11 18 1.1	13.212	8	2 36 21.72	1.9994	20 37 10.9	9.788
9	1 5 48.84	1.8683	11 31 12.2	13.158	9	2 38 21.79	2.0030	20 46 55.5	9.698
10	1 7 40.99	1.8701	11 44 20.1	13.104	10	2 40 22.08	2.0067	20 56 34.6	9.606
11	1 9 33.25	1.8718	11 57 24.7	13.050	11	2 42 22.59	2.0103	21 6 8.2	9.514
12	1 11 25.61	1.8737	12 10 26.1	12.995	12	2 44 23.32	2.0139	21 15 36.3	9.423
13	1 13 18.09	1.8757	12 23 24.1	12.939	13	2 46 24.26	2.0176	21 24 58.9	9.329
14	1 15 10.69	1.8776	12 36 18.8	12.883	14	2 48 25.43	2.0213	21 34 15.8	9.235
15	1 17 3.40	1.8796	12 49 10.0	12.824	15	2 50 26.82	2.0250	21 43 27.1	9.140
16	1 18 56.24	1.8818	13 1 57.7	12.766	16	2 52 28.43	2.0287	21 52 32.6	9.044
17	1 20 49.21	1.8838	13 14 41.9	12.707	17	2 54 30.26	2.0324	22 1 32.4	8.948
18	1 22 42.30	1.8860	13 27 22.5	12.647	18	2 56 32.32	2.0362	22 10 26.4	8.851
19	1 24 35.53	1.8883	13 39 59.5	12.586	19	2 58 34.60	2.0398	22 19 14.5	8.753
20	1 26 28.89	1.8905	13 52 32.8	12.524	20	3 0 37.10	2.0436	22 27 56.8	8.655
21	1 28 22.39	1.8928	14 5 2.4	12.463	21	3 2 39.83	2.0473	22 36 33.1	8.556
22	1 30 16.03	1.8952	14 17 28.3	12.399	22	3 4 42.78	2.0511	22 45 3.5	8.456
23	1 32 9.81	1.8976	N. 14 29 50.3	12.335	23	3 6 45.96	2.0549	N. 22 53 27.8	8.355
THURSDAY 18.					SATURDAY 20.				
0	1 34 3.74	1.9001	N. 14 42 8.5	12.271	0	3 8 49.37	2.0587	N. 23 1 46.1	8.254
1	1 35 57.82	1.9026	14 54 22.8	12.205	1	3 10 53.00	2.0624	23 9 58.3	8.152
2	1 37 52.05	1.9052	15 6 33.1	12.138	2	3 12 56.86	2.0662	23 18 4.3	8.048
3	1 39 46.44	1.9078	15 18 39.4	12.071	3	3 15 0.94	2.0699	23 26 4.1	7.945
4	1 41 40.99	1.9105	15 30 41.6	12.003	4	3 17 5.25	2.0738	23 33 57.7	7.841
5	1 43 35.70	1.9132	15 42 39.8	11.935	5	3 19 9.79	2.0775	23 41 45.0	7.736
6	1 45 30.57	1.9158	15 54 33.8	11.866	6	3 21 14.55	2.0813	23 49 26.0	7.630
7	1 47 25.60	1.9186	16 6 23.6	11.795	7	3 23 19.54	2.0851	23 57 0.6	7.523
8	1 49 20.80	1.9215	16 18 9.2	11.724	8	3 25 24.76	2.0888	24 4 28.8	7.417
9	1 51 16.18	1.9243	16 29 50.5	11.653	9	3 27 30.20	2.0925	24 11 50.6	7.309
10	1 53 11.72	1.9272	16 41 27.5	11.580	10	3 29 35.86	2.0963	24 19 5.9	7.201
11	1 55 7.44	1.9302	16 53 0.1	11.506	11	3 31 41.75	2.1000	24 26 14.7	7.092
12	1 57 3.34	1.9332	17 4 28.2	11.432	12	3 33 47.86	2.1037	24 33 16.9	6.981
13	1 58 59.42	1.9362	17 15 51.9	11.358	13	3 35 54.19	2.1074	24 40 12.4	6.870
14	2 0 55.68	1.9392	17 27 11.1	11.282	14	3 38 0.75	2.1112	24 47 1.3	6.759
15	2 2 52.12	1.9423	17 38 25.7	11.205	15	3 40 7.53	2.1148	24 53 43.5	6.648
16	2 4 48.75	1.9454	17 49 35.7	11.128	16	3 42 14.53	2.1185	25 0 19.0	6.534
17	2 6 45.57	1.9486	18 0 41.0	11.049	17	3 44 21.75	2.1221	25 6 47.6	6.421
18	2 8 42.58	1.9518	18 11 41.6	10.971	18	3 46 29.18	2.1257	25 13 9.5	6.308
19	2 10 39.78	1.9550	18 22 37.5	10.892	19	3 48 36.83	2.1293	25 19 24.5	6.193
20	2 12 37.18	1.9583	18 33 28.6	10.812	20	3 50 44.70	2.1329	25 25 32.6	6.078
21	2 14 34.77	1.9615	18 44 14.9	10.731	21	3 52 52.78	2.1365	25 31 33.8	5.962
22	2 16 32.56	1.9648	18 54 56.3	10.648	22	3 55 1.08	2.1400	25 37 28.0	5.845
23	2 18 30.55	1.9682	19 5 32.7	10.565	23	3 57 9.58	2.1435	25 43 15.2	5.728
24	2 20 28.74	1.9715	N. 19 16 4.1	10.482	24	3 59 18.30	2.1471	N. 25 48 55.3	5.610

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
SUNDAY 21.					TUESDAY 23.				
0	h m s	s	N. 25 48 55.3	5.610	0	h m s	s	N. 27 52 6.2	0.643
1	4 1 27.23	2.1505	25 54 28.4	5.492	1	5 47 50.80	2.2616	27 51 23.5	0.782
2	4 3 36.36	2.1539	25 59 54.3	5.374	2	5 50 6.52	2.2623	27 50 32.4	0.921
3	4 5 45.70	2.1573	26 5 13.0	5.253	3	5 52 22.28	2.2631	27 49 33.0	1.059
4	4 7 55.24	2.1607	26 10 24.6	5.133	4	5 54 38.09	2.2638	27 48 25.3	1.198
5	4 10 4.98	2.1640	26 15 28.9	5.011	5	5 56 53.93	2.2643	27 47 9.2	1.338
6	4 12 14.92	2.1673	26 20 25.9	4.889	6	5 59 9.81	2.2649	27 45 44.7	1.478
7	4 14 25.05	2.1705	26 25 15.6	4.768	7	6 1 25.72	2.2654	27 44 11.9	1.617
8	4 16 35.38	2.1738	26 29 58.0	4.645	8	6 3 41.66	2.2658	27 42 30.7	1.756
9	4 18 45.90	2.1769	26 34 33.0	4.521	9	6 5 57.62	2.2662	27 40 41.2	1.896
10	4 20 56.61	2.1801	26 39 0.5	4.397	10	6 8 13.60	2.2665	27 38 43.2	2.036
11	4 23 7.51	2.1833	26 43 20.6	4.273	11	6 10 29.60	2.2667	27 36 36.9	2.175
12	4 25 18.60	2.1863	26 47 33.3	4.148	12	6 12 45.60	2.2668	27 34 22.2	2.315
13	4 27 29.87	2.1893	26 51 38.4	4.023	13	6 15 1.61	2.2668	27 31 59.1	2.455
14	4 29 41.32	2.1923	26 55 36.0	3.897	14	6 17 17.62	2.2668	27 29 27.6	2.594
15	4 31 52.94	2.1952	26 59 26.0	3.770	15	6 19 33.63	2.2668	27 26 47.8	2.733
16	4 34 4.74	2.1981	27 3 8.4	3.643	16	6 21 49.63	2.2667	27 23 59.6	2.873
17	4 36 16.71	2.2009	27 6 43.1	3.515	17	6 24 5.63	2.2665	27 21 3.0	3.013
18	4 38 28.85	2.2038	27 10 10.2	3.387	18	6 26 21.61	2.2663	27 17 58.0	3.153
19	4 40 41.16	2.2065	27 13 29.5	3.258	19	6 28 37.58	2.2659	27 14 44.6	3.293
20	4 42 53.63	2.2092	27 16 41.1	3.129	20	6 30 53.52	2.2655	27 11 22.9	3.432
21	4 45 6.26	2.2118	27 19 45.0	3.000	21	6 33 9.44	2.2651	27 7 52.8	3.572
22	4 47 19.05	2.2144	27 22 41.1	2.870	22	6 35 25.33	2.2646	27 4 14.3	3.711
23	4 49 31.99	2.2169	N. 27 25 29.4	2.739	23	6 37 41.19	2.2640	N. 27 0 27.5	3.850
MONDAY 22.					WEDNESDAY 24.				
0	4 51 45.08	2.2194	N. 27 28 9.8	2.608	0	6 39 57.01	2.2633	N. 26 56 32.3	3.989
1	4 53 58.32	2.2218	27 30 42.3	2.477	1	6 42 12.79	2.2627	26 52 28.8	4.128
2	4 56 11.70	2.2242	27 33 7.0	2.345	2	6 44 28.53	2.2619	26 48 17.0	4.267
3	4 58 25.22	2.2265	27 35 23.7	2.213	3	6 46 44.22	2.2611	26 43 56.8	4.405
4	5 0 38.88	2.2288	27 37 32.5	2.080	4	6 48 59.86	2.2603	26 39 28.4	4.543
5	5 2 52.67	2.2310	27 39 33.3	1.948	5	6 51 15.45	2.2593	26 34 51.7	4.681
6	5 5 6.60	2.2332	27 41 26.2	1.814	6	6 53 30.98	2.2583	26 30 6.7	4.819
7	5 7 20.65	2.2352	27 43 11.0	1.679	7	6 55 46.45	2.2573	26 25 13.4	4.957
8	5 9 34.82	2.2372	27 44 47.7	1.545	8	6 58 1.85	2.2562	26 20 11.9	5.094
9	5 11 49.11	2.2392	27 46 16.4	1.411	9	7 0 17.19	2.2551	26 15 2.1	5.232
10	5 14 3.52	2.2411	27 47 37.0	1.276	10	7 2 32.46	2.2539	26 9 44.1	5.369
11	5 16 18.04	2.2428	27 48 49.5	1.140	11	7 4 47.66	2.2527	26 4 17.8	5.506
12	5 18 32.66	2.2446	27 49 53.9	1.005	12	7 7 2.78	2.2513	25 58 43.4	5.642
13	5 20 47.39	2.2463	27 50 50.1	0.869	13	7 9 17.82	2.2500	25 53 0.8	5.778
14	5 23 2.22	2.2479	27 51 38.2	0.733	14	7 11 32.78	2.2487	25 47 10.0	5.914
15	5 25 17.14	2.2495	27 52 18.1	0.597	15	7 13 47.66	2.2473	25 41 11.1	6.049
16	5 27 32.16	2.2510	27 52 49.8	0.459	16	7 16 2.45	2.2457	25 35 4.1	6.184
17	5 29 47.26	2.2524	27 53 13.2	0.322	17	7 18 17.14	2.2441	25 28 49.0	6.319
18	5 32 2.45	2.2538	27 53 28.4	0.185	18	7 20 31.74	2.2426	25 22 25.8	6.454
19	5 34 17.72	2.2552	27 53 35.4	+0.048	19	7 22 46.25	2.2410	25 15 54.5	6.588
20	5 36 33.07	2.2563	27 53 34.1	-0.090	20	7 25 0.66	2.2393	25 9 15.2	6.722
21	5 38 48.48	2.2575	27 53 24.6	0.228	21	7 27 14.97	2.2377	25 2 27.9	6.855
22	5 41 3.97	2.2587	27 53 6.8	0.366	22	7 29 29.18	2.2359	24 55 32.6	6.988
23	5 43 19.52	2.2597	27 52 40.7	0.505	23	7 31 43.28	2.2342	24 48 29.3	7.121
24	5 45 35.13	2.2607	N. 27 52 6.2	0.643	24	7 33 57.28	2.2324	N. 24 41 18.1	7.253

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.
THURSDAY 25.					SATURDAY 27.			
	h m s	s	° ' "	"		h m s	s	° ' "
0	7 33 57.28	2.2324	N. 24 41 18.1	7.253	0	9 18 42.95	2.1328	N. 16 31 44.4
1	7 36 11.17	2.2306	24 33 59.0	7.384	1	9 20 50.87	2.1311	16 18 48.6
2	7 38 24.95	2.2287	24 26 32.0	7.515	2	9 22 58.68	2.1293	16 5 47.0
3	7 40 38.61	2.2268	24 18 57.2	7.646	3	9 25 6.39	2.1277	15 52 39.5
4	7 42 52.16	2.2248	24 11 14.5	7.777	4	9 27 14.00	2.1260	15 39 26.3
5	7 45 5.59	2.2229	24 3 24.0	7.907	5	9 29 21.51	2.1243	15 26 7.3
6	7 47 18.91	2.2210	23 55 25.7	8.036	6	9 31 28.92	2.1228	15 12 42.7
7	7 49 32.11	2.2190	23 47 19.7	8.164	7	9 33 36.24	2.1212	14 59 12.6
8	7 51 45.19	2.2169	23 39 6.0	8.293	8	9 35 43.46	2.1196	14 45 36.9
9	7 53 58.14	2.2148	23 30 44.6	8.420	9	9 37 50.59	2.1181	14 31 55.7
10	7 56 10.97	2.2128	23 22 15.6	8.548	10	9 39 57.63	2.1167	14 18 9.1
11	7 58 23.68	2.2108	23 13 38.9	8.674	11	9 42 4.59	2.1153	14 4 17.2
12	8 0 36.26	2.2086	23 4 54.7	8.800	12	9 44 11.47	2.1140	13 50 20.1
13	8 2 48.71	2.2065	22 56 2.9	8.926	13	9 46 18.27	2.1127	13 36 17.7
14	8 5 1.04	2.2043	22 47 3.6	9.050	14	9 48 24.99	2.1114	13 22 10.1
15	8 7 13.23	2.2022	22 37 56.9	9.174	15	9 50 31.64	2.1103	13 7 57.5
16	8 9 25.30	2.2001	22 28 42.7	9.297	16	9 52 38.22	2.1091	12 53 39.9
17	8 11 37.24	2.1979	22 19 21.1	9.422	17	9 54 44.73	2.1079	12 39 17.3
18	8 13 49.05	2.1957	22 9 52.1	9.545	18	9 56 51.17	2.1068	12 24 49.7
19	8 16 0.72	2.1934	22 0 15.7	9.667	19	9 58 57.55	2.1058	12 10 17.3
20	8 18 12.26	2.1913	21 50 32.1	9.788	20	10 1 3.87	2.1049	11 55 40.2
21	8 20 23.67	2.1891	21 40 41.2	9.908	21	10 3 10.14	2.1040	11 40 58.4
22	8 22 34.95	2.1869	21 30 43.1	10.028	22	10 5 16.35	2.1031	11 26 12.0
23	8 24 46.10	2.1848	N. 21 20 37.9	10.147	23	10 7 22.51	2.1023	N. 11 11 21.0
FRIDAY 26.					SUNDAY 28.			
	h m s	s	° ' "	"		h m s	s	° ' "
0	8 26 57.12	2.1825	N. 21 10 25.5	10.266	0	10 9 28.62	2.1016	N. 10 56 25.5
1	8 29 8.00	2.1803	21 0 6.0	10.383	1	10 11 34.70	2.1009	10 41 25.6
2	8 31 18.75	2.1781	20 49 39.5	10.500	2	10 13 40.73	2.1003	10 26 21.3
3	8 33 29.37	2.1758	20 39 6.0	10.617	3	10 15 46.73	2.0998	10 11 12.8
4	8 35 39.85	2.1736	20 28 25.5	10.733	4	10 17 52.70	2.0993	9 56 0.0
5	8 37 50.20	2.1714	20 17 38.0	10.849	5	10 19 58.64	2.0988	9 40 43.1
6	8 40 0.42	2.1693	20 6 43.7	10.962	6	10 22 4.55	2.0983	9 25 22.1
7	8 42 10.51	2.1671	19 55 42.6	11.075	7	10 24 10.44	2.0981	9 9 57.2
8	8 44 20.47	2.1649	19 44 34.7	11.188	8	10 26 16.32	2.0978	8 54 28.3
9	8 46 30.30	2.1628	19 33 20.0	11.300	9	10 28 22.18	2.0977	8 38 55.6
10	8 48 40.00	2.1607	19 21 58.7	11.411	10	10 30 28.04	2.0976	8 23 19.1
11	8 50 49.58	2.1586	19 10 30.7	11.522	11	10 32 33.89	2.0974	8 7 38.9
12	8 52 59.03	2.1564	18 58 56.1	11.631	12	10 34 39.73	2.0974	7 51 55.1
13	8 55 8.35	2.1543	18 47 15.0	11.740	13	10 36 45.58	2.0975	7 36 7.8
14	8 57 17.55	2.1523	18 35 27.3	11.848	14	10 38 51.43	2.0976	7 20 17.0
15	8 59 26.62	2.1502	18 23 33.2	11.955	15	10 40 57.29	2.0978	7 4 22.9
16	9 1 35.57	2.1482	18 11 32.7	12.062	16	10 43 3.16	2.0980	6 48 25.5
17	9 3 44.40	2.1462	17 59 25.8	12.167	17	10 45 9.05	2.0984	6 32 24.8
18	9 5 53.11	2.1442	17 47 12.7	12.271	18	10 47 14.97	2.0988	6 16 21.0
19	9 8 1.70	2.1423	17 34 53.3	12.375	19	10 49 20.91	2.0993	6 0 14.2
20	9 10 10.18	2.1403	17 22 27.7	12.478	20	10 51 26.88	2.0998	5 44 4.4
21	9 12 18.54	2.1384	17 9 50.0	12.580	21	10 53 32.88	2.1003	5 27 51.7
22	9 14 26.79	2.1366	16 57 18.1	12.682	22	10 55 38.92	2.1011	5 11 36.2
23	9 16 34.93	2.1347	16 44 34.2	12.781	23	10 57 45.01	2.1019	4 55 18.0
24	9 18 42.95	2.1328	N. 16 31 44.4	12.880	24	10 59 51.15	2.1028	N. 4 38 57.2

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
MONDAY 29.					WEDNESDAY 31.				
	h m s	s	° ' "	"		h m s	s	° ' "	"
0	10 59 51.15	2.1028	N. 4 38 57.2	16.368	0	12 43 10.74	2.2323	S. 8 46 21.7	16.522
1	11 1 57.34	2.1036	4 22 33.8	16.410	1	12 45 24.82	2.2369	9 2 51.8	16.480
2	11 4 3.58	2.1045	4 6 8.0	16.450	2	12 47 39.17	2.2415	9 19 19.3	16.436
3	11 6 9.88	2.1056	3 49 39.8	16.489	3	12 49 53.80	2.2462	9 35 44.1	16.391
4	11 8 16.25	2.1068	3 33 9.3	16.527	4	12 52 8.71	2.2509	9 52 6.2	16.343
5	11 10 22.69	2.1079	3 16 36.6	16.563	5	12 54 23.91	2.2558	10 8 25.3	16.293
6	11 12 29.20	2.1092	3 0 1.8	16.597	6	12 56 39.41	2.2608	10 24 41.4	16.242
7	11 14 35.79	2.1106	2 43 25.0	16.630	7	12 58 55.20	2.2657	10 40 54.3	16.188
8	11 16 42.47	2.1120	2 26 46.2	16.662	8	13 1 11.29	2.2708	10 57 3.9	16.133
9	11 18 49.23	2.1134	2 10 5.6	16.691	9	13 3 27.69	2.2758	11 13 10.2	16.076
10	11 20 56.08	2.1150	1 53 23.3	16.719	10	13 5 44.39	2.2809	11 29 13.0	16.016
11	11 23 3.03	2.1167	1 36 39.3	16.746	11	13 8 1.40	2.2862	11 45 12.1	15.953
12	11 25 10.08	2.1183	1 19 53.8	16.770	12	13 10 18.73	2.2915	12 1 7.4	15.890
13	11 27 17.23	2.1202	1 3 6.9	16.793	13	13 12 36.38	2.2968	12 16 58.9	15.824
14	11 29 24.50	2.1221	0 46 18.6	16.816	14	13 14 54.35	2.3022	12 32 46.3	15.756
15	11 31 31.88	2.1240	0 29 29.0	16.836	15	13 17 12.64	2.3076	12 48 29.6	15.686
16	11 33 39.38	2.1261	N. 0 12 38.3	16.855	16	13 19 31.26	2.3131	13 4 8.6	15.613
17	11 35 47.01	2.1282	S. 0 4 13.6	16.873	17	13 21 50.21	2.3187	13 19 43.2	15.539
18	11 37 54.76	2.1303	0 21 6.4	16.887	18	13 24 9.50	2.3243	13 35 13.3	15.463
19	11 40 2.65	2.1327	0 38 0.0	16.900	19	13 26 29.13	2.3299	13 50 38.8	15.385
20	11 42 10.68	2.1350	0 54 54.4	16.913	20	13 28 49.09	2.3356	14 5 59.5	15.304
21	11 44 18.85	2.1373	1 11 49.5	16.923	21	13 31 9.40	2.3413	14 21 15.3	15.222
22	11 46 27.16	2.1398	1 28 45.2	16.932	22	13 33 30.05	2.3471	14 36 26.1	15.137
23	11 48 35.63	2.1425	S. 1 45 41.3	16.938	23	13 35 51.05	2.3529	S. 14 51 31.7	15.050
TUESDAY 30.					THURSDAY APRIL 1.				
0	11 50 44.26	2.1452	S. 2 2 37.8	16.943	0	13 38 12.40	2.3588	S. 15 6 32.1	14.962
1	11 52 53.05	2.1479	2 19 34.5	16.947	PHASES OF THE MOON.				
2	11 55 2.01	2.1508	2 36 31.4	16.948					
3	11 57 11.14	2.1536	2 53 28.3	16.948					
4	11 59 20.44	2.1566	3 10 25.2	16.947					
5	12 1 29.93	2.1597	3 27 21.9	16.943	<div><div></div><div>Full Moon</div></div> <div><div></div><div>Last Quarter</div></div> <div><div></div><div>New Moon</div></div> <div><div></div><div>First Quarter</div></div> <div><div></div><div>Full Moon</div></div>				
6	12 3 39.60	2.1628	3 44 18.4	16.938					
7	12 5 49.46	2.1660	4 1 14.4	16.930					
8	12 7 59.52	2.1693	4 18 10.0	16.922					
9	12 10 9.77	2.1726	4 35 5.0	16.911	<div><div></div><div>Perigee</div></div> <div><div></div><div>Apogee</div></div>				
10	12 12 20.23	2.1761	4 51 59.3	16.898					
11	12 14 30.90	2.1797	5 8 52.7	16.883					
12	12 16 41.79	2.1833	5 25 45.2	16.867					
13	12 18 52.89	2.1869	5 42 36.7	16.848	<div><div></div><div>Perigee</div></div> <div><div></div><div>Apogee</div></div>				
14	12 21 4.22	2.1907	5 59 27.0	16.828					
15	12 23 15.77	2.1945	6 16 16.0	16.806					
16	12 25 27.56	2.1984	6 33 3.7	16.783					
17	12 27 39.58	2.2024	6 49 49.9	16.757	<div><div></div><div>Perigee</div></div> <div><div></div><div>Apogee</div></div>				
18	12 29 51.85	2.2065	7 6 34.5	16.729					
19	12 32 4.36	2.2106	7 23 17.4	16.699					
20	12 34 17.12	2.2148	7 39 58.4	16.667					
21	12 36 30.13	2.2190	7 56 37.4	16.633	<div><div></div><div>Perigee</div></div> <div><div></div><div>Apogee</div></div>				
22	12 38 43.40	2.2234	8 13 14.4	16.598					
23	12 40 56.94	2.2278	8 29 49.2	16.561					
24	12 43 10.74	2.2323	S. 8 46 21.7	16.522					

AT GREENWICH APPARENT NOON.

Day of the Week.	Day of the Month.	THE SUN'S					Sidereal Time of Semidiameter Passing Meridian.	Equation of Time, to be Added to Subtracted from Apparent Time.	Diff. for Ho
		Apparent Right Ascension.	Diff. for 1 Hour.	Apparent Declination.	Diff. for 1 Hour.	Semidiameter.			
		h m s	s	° ' "	"	' "	s	m s	s
Thur.	1	0 39 17.25	9.096	N. 4 13 56.4	+57.99	16 2.05	64.47	4 13.33	0.7
Fri.	2	0 42 55.58	9.100	4 37 6.0	57.80	16 1.77	64.49	3 55.16	0.7
Sat.	3	0 46 34.04	9.105	5 0 10.7	57.59	16 1.49	64.51	3 37.11	0.7
SUN.	4	0 50 12.64	9.112	5 23 10.2	+57.37	16 1.21	64.53	3 19.21	0.7
Mon.	5	0 53 51.40	9.119	5 46 4.3	57.13	16 0.93	64.55	3 1.47	0.7
Tues.	6	0 57 30.36	9.127	6 8 52.4	56.88	16 0.65	64.57	2 43.91	0.7
Wed.	7	1 1 9.51	9.136	6 31 34.3	+56.61	16 0.36	64.60	2 26.57	0.7
Thur.	8	1 4 48.89	9.146	6 54 9.6	56.33	16 0.08	64.63	2 9.44	0.7
Fri.	9	1 8 28.51	9.156	7 16 38.0	56.03	15 59.80	64.67	1 52.55	0.6
Sat.	10	1 12 8.39	9.167	7 38 59.1	+55.72	15 59.52	64.71	1 35.92	0.6
SUN.	11	1 15 48.54	9.179	8 1 12.6	55.39	15 59.24	64.75	1 19.56	0.6
Mon.	12	1 19 28.97	9.191	8 23 18.1	55.05	15 58.97	64.79	1 3.48	0.6
Tues.	13	1 23 9.70	9.204	8 45 15.1	+54.70	15 58.70	64.83	0 47.70	0.6
Wed.	14	1 26 50.74	9.217	9 7 3.5	54.33	15 58.43	64.88	0 32.23	0.6
Thur.	15	1 30 32.12	9.231	9 28 42.7	53.94	15 58.16	64.93	0 17.09	0.6
Fri.	16	1 34 13.82	9.245	9 50 12.4	+53.54	15 57.89	64.98	0 2.28	0.6
Sat.	17	1 37 55.88	9.260	10 11 32.4	53.12	15 57.62	65.03	0 12.17	0.6
SUN.	18	1 41 38.30	9.275	10 32 42.2	52.69	15 57.36	65.09	0 26.27	0.6
Mon.	19	1 45 21.10	9.291	10 53 41.5	+52.25	15 57.10	65.15	0 39.99	0.6
Tues.	20	1 49 4.28	9.308	11 14 29.9	51.79	15 56.84	65.21	0 53.32	0.6
Wed.	21	1 52 47.87	9.325	11 35 7.2	51.31	15 56.59	65.27	1 6.26	0.6
Thur.	22	1 56 31.86	9.342	11 55 32.9	+50.82	15 56.34	65.33	1 18.78	0.6
Fri.	23	2 0 16.28	9.360	12 15 46.7	50.32	15 56.09	65.39	1 30.88	0.6
Sat.	24	2 4 1.14	9.378	12 35 48.4	49.81	15 55.84	65.46	1 42.56	0.6
SUN.	25	2 7 46.43	9.397	12 55 37.6	+49.28	15 55.59	65.53	1 53.79	0.6
Mon.	26	2 11 32.19	9.416	13 15 14.1	48.74	15 55.34	65.60	2 4.55	0.6
Tues.	27	2 15 18.42	9.436	13 34 37.4	48.19	15 55.09	65.67	2 14.85	0.6
Wed.	28	2 19 5.14	9.457	13 53 47.4	+47.63	15 54.85	65.74	2 24.66	0.6
Thur.	29	2 22 52.35	9.478	14 12 43.6	47.05	15 54.60	65.81	2 33.98	0.6
Fri.	30	2 26 40.08	9.500	14 31 25.9	46.46	15 54.36	65.89	2 42.77	0.6
Sat.	31	2 30 28.34	9.522	N. 14 49 53.9	+45.86	15 54.12	65.97	2 51.04	0.6

NOTE.—The mean time of semidiameter passing the meridian may be found by subtracting 0.18 from the sidereal time.

The sign + prefixed to the hourly change of declination indicates that north declinations are increasing.

AT GREENWICH MEAN NOON.

P. M.	Day of the Month.	THE SUN'S				Equation of Time, to be Subtracted from		Diff. for 1 Hour.	Sidereal Time, or Right Ascension of Mean Sun.
		Apparent Right Ascension.	Diff. for 1 Hour.	Apparent Declination.	Diff. for 1 Hour.	Added to Mean Time.			
		h m s	s	° ' "	"	m s	s	s	h m s
ir.	1	0 39 16.61	9.097	N. 4 13 52.3	+58.01	4 13.39	0.759	0 35 3.22	
.	2	0 42 54.99	9.102	4 37 2.2	57.81	3 55.21	0.755	0 38 59.78	
.	3	0 46 33.49	9.107	5 0 7.2	57.60	3 37.16	0.749	0 42 56.33	
N.	4	0 50 12.14	9.114	5 23 7.1	+57.38	3 19.25	0.743	0 46 52.88	
n.	5	0 53 50.94	9.121	5 46 1.4	57.14	3 1.50	0.736	0 50 49.44	
es.	6	0 57 29.94	9.129	6 8 49.8	56.89	2 43.95	0.727	0 54 45.99	
sd.	7	1 1 9.14	9.138	6 31 32.0	+56.62	2 26.60	0.718	0 58 42.55	
ur.	8	1 4 48.56	9.148	6 54 7.6	56.34	2 9.46	0.709	1 2 39.10	
.	9	1 8 28.23	9.158	7 16 36.3	56.04	1 52.57	0.699	1 6 35.65	
.	10	1 12 8.14	9.169	7 38 57.6	+55.73	1 35.94	0.688	1 10 32.21	
N.	11	1 15 48.33	9.180	8 1 11.4	55.41	1 19.57	0.676	1 14 28.76	
n.	12	1 19 28.81	9.192	8 23 17.1	55.07	1 3.49	0.664	1 18 25.32	
es.	13	1 23 9.58	9.205	8 45 14.4	+54.71	0 47.71	0.651	1 22 21.87	
sd.	14	1 26 50.66	9.218	9 7 3.0	54.34	0 32.24	0.638	1 26 18.42	
ur.	15	1 30 32.07	9.232	9 28 42.4	53.95	0 17.09	0.624	1 30 14.98	
.	16	1 34 13.82	9.247	9 50 12.4	+53.54	0 2.28	0.610	1 34 11.53	
.	17	1 37 55.92	9.262	10 11 32.6	53.12	0 12.17	0.595	1 38 8.09	
N.	18	1 41 38.37	9.277	10 32 42.6	52.69	0 26.27	0.580	1 42 4.64	
n.	19	1 45 21.21	9.293	10 53 42.1	+52.25	0 39.99	0.564	1 46 1.20	
es.	20	1 49 4.42	9.309	11 14 30.7	51.79	0 53.33	0.547	1 49 57.75	
d.	21	1 52 48.04	9.326	11 35 8.1	51.32	1 6.27	0.531	1 53 54.31	
ir.	22	1 56 32.07	9.343	11 55 34.0	+50.83	1 18.80	0.513	1 57 50.86	
.	23	2 0 16.52	9.361	12 15 48.0	50.33	1 30.90	0.495	2 1 47.42	
.	24	2 4 1.40	9.379	12 35 49.9	49.82	1 42.57	0.477	2 5 43.97	
N.	25	2 7 46.73	9.398	12 55 39.2	+49.29	1 53.80	0.458	2 9 40.53	
n.	26	2 11 32.52	9.417	13 15 15.8	48.75	2 4.57	0.439	2 13 37.08	
es.	27	2 15 18.77	9.437	13 34 39.2	48.20	2 14.86	0.419	2 17 33.64	
d.	28	2 19 5.52	9.458	13 53 49.3	+47.64	2 24.68	0.398	2 21 30.19	
ir.	29	2 22 52.76	9.479	14 12 45.6	47.06	2 33.99	0.377	2 25 26.75	
.	30	2 26 40.51	9.501	14 31 28.0	46.47	2 42.79	0.355	2 29 23.30	
.	31	2 30 28.80	9.523	N. 14 49 56.1	+45.87	2 51.06	0.333	2 33 19.86	

NOTE.—The semidiameter for mean noon may be assumed the same as that for apparent noon.
The sign + prefixed to the hourly change of declination indicates that north declinations are increasing.

Diff. for 1 Hour,
+9°.8565.
(Table III.)

AT GREENWICH MEAN NOON.

Day of the Month.	Day of the Year.	THE SUN'S				Logarithm of the Radius Vector of the Earth.	Diff. for 1 Hour.	Mean Sidereal
		True Longitude.		Diff. for 1 Hour.	Latitude.			
		λ	λ'					
		$^{\circ}$ $'$ $''$	$^{\circ}$ $'$ $''$	$''$	$''$			h
1	91	10 41 22.3	41 0.3	147.93	-0.37	9.999 7495	+52.6	23
2	92	11 40 31.6	40 9.6	147.85	0.42	9.999 8761	52.9	23 1
3	93	12 39 39.1	39 17.0	147.77	0.44	0.000 0032	53.1	23 1
4	94	13 38 44.8	38 22.6	147.70	-0.42	0.000 1308	+53.2	23
5	95	14 37 48.7	37 26.4	147.62	0.37	0.000 2586	53.2	23
6	96	15 36 50.9	36 28.4	147.55	0.30	0.000 3864	53.2	23
7	97	16 35 51.4	35 28.8	147.48	-0.19	0.000 5140	+53.1	22 5
8	98	17 34 50.1	34 27.4	147.41	-0.07	0.000 6414	52.9	22 5
9	99	18 33 47.1	33 24.2	147.34	+0.06	0.000 7683	52.7	22 4
10	100	19 32 42.2	32 19.3	147.26	+0.19	0.000 8946	+52.4	22 4
11	101	20 31 35.6	31 12.5	147.19	0.31	0.001 0202	52.1	22 4
12	102	21 30 27.1	30 3.9	147.11	0.44	0.001 1449	51.8	22 3
13	103	22 29 16.8	28 53.4	147.03	+0.53	0.001 2686	+51.4	22 3
14	104	23 28 4.4	27 41.0	146.95	0.61	0.001 3914	50.9	22 2
15	105	24 26 50.1	26 26.6	146.87	0.67	0.001 5132	50.5	22 2
16	106	25 25 33.8	25 10.1	146.78	+0.70	0.001 6339	+50.1	22 2
17	107	26 24 15.4	23 51.6	146.69	0.70	0.001 7536	49.7	22 1
18	108	27 22 54.9	22 31.0	146.60	0.68	0.001 8723	49.2	22 1
19	109	28 21 32.2	21 8.2	146.51	+0.64	0.001 9900	+48.8	22 1
20	110	29 20 7.5	19 43.3	146.42	0.57	0.002 1067	48.4	22
21	111	30 18 40.5	18 16.2	146.33	0.48	0.002 2225	48.1	22
22	112	31 17 11.4	16 47.0	146.24	+0.36	0.002 3375	+47.7	21 5
23	113	32 15 40.2	15 15.6	146.15	0.23	0.002 4517	47.4	21 5
24	114	33 14 6.7	13 42.0	146.06	+0.10	0.002 5652	47.2	21 5
25	115	34 12 31.1	12 6.3	145.97	-0.03	0.002 6782	+47.0	21 4
26	116	35 10 53.4	10 28.4	145.89	0.15	0.002 7906	46.8	21 4
27	117	36 9 13.7	8 48.6	145.80	0.25	0.002 9027	46.6	21 3
28	118	37 7 32.0	7 6.7	145.72	-0.33	0.003 0144	+46.5	21 3
29	119	38 5 48.3	5 23.0	145.64	0.38	0.003 1259	46.4	21 3
30	120	39 4 2.9	3 37.4	145.57	0.40	0.003 2371	46.3	21 2
31	121	40 2 15.8	1 50.1	145.50	-0.38	0.003 3479	+46.1	21 2

NOTE.—The longitudes in the column λ are referred to the true equinox of their own date, while those in the column λ' are referred to the mean equinox of the beginning of the Besselian fictitious year.

Diff. f
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GREENWICH MEAN TIME.

Day of the Month.	THE MOON'S								
	SEMIDIAMETER.		HORIZONTAL PARALLAX.				UPPER TRANSIT.		AGE.
	Noon.	Midnight.	Noon.	Diff. for 1 Hour.	Midnight.	Diff. for 1 Hour.	Meridian of Greenwich.	Diff. for 1 Hour.	Noon.
	' "	' "	' "	"	' "	"	h m	m	d
1	16 33.2	16 33.7	60 39.21	+0.329	60 41.11	-0.011	13 33.5	2.37	16.7
2	16 33.2	16 31.5	60 39.00	-0.338	60 33.10	0.640	14 32.2	2.52	17.7
3	16 29.0	16 25.6	60 23.76	0.910	60 11.40	1.143	15 34.3	2.63	18.7
4	16 21.6	16 16.9	59 56.49	-1.336	59 39.50	-1.488	16 37.9	2.64	19.7
5	16 11.9	16 6.5	59 20.95	1.598	59 1.31	1.670	17 40.1	2.53	20.7
6	16 1.0	15 55.4	58 41.01	1.708	58 20.44	1.716	18 38.8	2.35	21.7
7	15 49.8	15 44.3	57 59.93	-1.699	57 39.73	-1.665	19 32.7	2.14	22.7
8	15 38.9	15 33.7	57 20.03	1.616	57 1.00	1.555	20 22.0	1.97	23.7
9	15 28.8	15 24.0	56 42.74	1.487	56 25.32	1.416	21 7.4	1.83	24.7
10	15 19.5	15 15.2	56 8.78	-1.341	55 53.14	-1.266	21 50.3	1.75	25.7
11	15 11.2	15 7.4	55 38.40	1.192	55 24.54	1.118	22 31.7	1.71	26.7
12	15 3.9	15 0.6	55 11.57	1.043	54 59.52	0.966	23 12.8	1.72	27.7
13	14 57.6	14 54.8	54 48.40	-0.888	54 38.22	-0.808	23 54.5	1.76	28.7
14	14 52.3	14 50.1	54 29.02	0.723	54 20.89	0.631	6	.	0.0
15	14 48.2	14 46.6	54 13.91	0.531	54 8.17	0.424	0 37.7	1.84	1.0
16	14 45.4	14 44.6	54 3.78	-0.306	54 0.86	-0.179	1 23.0	1.94	2.0
17	14 44.3	14 44.4	53 59.53	-0.041	53 59.92	+0.109	2 10.7	2.03	3.0
18	14 45.0	14 46.2	54 2.18	+0.270	54 6.43	0.440	3 0.4	2.10	4.0
19	14 47.9	14 50.2	54 12.77	+0.618	54 21.30	+0.805	3 51.5	2.14	5.0
20	14 53.2	14 56.8	54 32.11	0.998	54 45.26	1.195	4 43.0	2.14	6.0
21	15 1.0	15 5.8	55 0.79	1.392	55 18.66	1.585	5 33.9	2.10	7.0
22	15 11.3	15 17.4	55 38.80	+1.771	56 1.11	+1.945	6 23.5	2.03	8.0
23	15 24.0	15 31.1	56 25.40	2.101	56 51.43	2.233	7 11.6	1.98	9.0
24	15 38.6	15 46.4	57 18.87	2.335	57 47.33	2.402	7 58.7	1.95	10.0
25	15 54.3	16 2.2	58 16.33	+2.424	58 45.30	+2.396	8 45.5	1.96	11.0
26	16 9.9	16 17.2	59 13.61	2.313	59 40.57	2.170	9 33.2	2.02	12.0
27	16 24.0	16 30.0	60 5.46	1.969	60 27.59	1.710	10 23.1	2.14	13.0
28	16 35.1	16 39.1	60 46.29	+1.398	61 0.97	+1.042	11 16.5	2.31	14.0
29	16 41.9	16 43.4	61 11.17	+0.654	61 16.60	+0.248	12 14.4	2.51	15.0
30	16 43.5	16 42.3	61 17.11	-0.163	61 12.74	-0.562	13 16.9	2.68	16.0
31	16 39.9	16 36.3	61 3.74	-0.933	60 50.50	-1.266	14 22.4	2.75	17.0

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	
THURSDAY 1.					SATURDAY 3.				
0	h m s	s	° ' "	"	0	h m s	s	° ' "	
0	13 38 12.40	2.3588	S. 15 6 32.1	14.962	0	15 38 19.86	2.6353	S. 24 44 5.6	
1	13 40 34.10	2.3647	15 21 27.1	14.871	1	15 40 58.11	2.6396	24 52 23.6	
2	13 42 56.16	2.3707	15 36 16.6	14.778	2	15 43 36.61	2.6438	25 0 30.8	
3	13 45 18.58	2.3767	15 51 0.4	14.683	3	15 46 15.36	2.6479	25 8 27.2	
4	13 47 41.36	2.3827	16 5 38.5	14.586	4	15 48 54.36	2.6519	25 16 12.7	
5	13 50 4.50	2.3887	16 20 10.7	14.487	5	15 51 33.59	2.6558	25 23 47.3	
6	13 52 28.00	2.3947	16 34 36.9	14.385	6	15 54 13.05	2.6596	25 31 10.8	
7	13 54 51.86	2.4008	16 48 56.9	14.282	7	15 56 52.74	2.6633	25 38 23.2	
8	13 57 16.09	2.4069	17 3 10.7	14.177	8	15 59 32.64	2.6667	25 45 24.5	
9	13 59 40.69	2.4130	17 17 18.1	14.069	9	16 2 12.74	2.6700	25 52 14.6	
10	14 2 5.65	2.4191	17 31 19.0	13.959	10	16 4 53.04	2.6732	25 58 53.4	
11	14 4 30.98	2.4253	17 45 13.2	13.848	11	16 7 33.52	2.6763	26 5 20.8	
12	14 6 56.68	2.4314	17 59 0.7	13.734	12	16 10 14.19	2.6793	26 11 36.9	
13	14 9 22.75	2.4376	18 12 41.3	13.618	13	16 12 55.03	2.6820	26 17 41.5	
14	14 11 49.19	2.4438	18 26 14.9	13.501	14	16 15 36.03	2.6847	26 23 34.6	
15	14 14 16.00	2.4499	18 39 41.4	13.381	15	16 18 17.19	2.6872	26 29 16.2	
16	14 16 43.18	2.4562	18 53 0.6	13.259	16	16 20 58.49	2.6894	26 34 46.2	
17	14 19 10.74	2.4623	19 6 12.5	13.135	17	16 23 39.92	2.6915	26 40 4.6	
18	14 21 38.66	2.4685	19 19 16.8	13.009	18	16 26 21.47	2.6935	26 45 11.4	
19	14 24 6.96	2.4747	19 32 13.6	12.882	19	16 29 3.14	2.6954	26 50 6.5	
20	14 26 35.62	2.4808	19 45 2.6	12.752	20	16 31 44.92	2.6971	26 54 49.8	
21	14 29 4.66	2.4870	19 57 43.8	12.620	21	16 34 26.79	2.6986	26 59 21.4	
22	14 31 34.06	2.4931	20 10 17.0	12.486	22	16 37 8.75	2.6999	27 3 41.2	
23	14 34 3.83	2.4992	S. 20 22 42.1	12.350	23	16 39 50.78	2.7011	S. 27 7 49.2	
FRIDAY 2.					SUNDAY 4.				
0	h m s	s	° ' "	"	0	h m s	s	° ' "	
0	14 36 33.96	2.5053	S. 20 34 59.0	12.213	0	16 42 32.88	2.7022	S. 27 11 45.4	
1	14 39 4.46	2.5113	20 47 7.6	12.073	1	16 45 15.04	2.7030	27 15 29.7	
2	14 41 35.32	2.5173	20 59 7.8	11.932	2	16 47 57.24	2.7036	27 19 2.1	
3	14 44 6.54	2.5233	21 10 59.4	11.788	3	16 50 39.47	2.7041	27 22 22.6	
4	14 46 38.12	2.5293	21 22 42.4	11.643	4	16 53 21.73	2.7044	27 25 31.3	
5	14 49 10.06	2.5353	21 34 16.6	11.497	5	16 56 4.00	2.7045	27 28 28.1	
6	14 51 42.35	2.5411	21 45 42.0	11.348	6	16 58 46.27	2.7044	27 31 12.9	
7	14 54 14.99	2.5469	21 56 58.4	11.198	7	17 1 28.53	2.7043	27 33 45.8	
8	14 56 47.98	2.5527	22 8 5.7	11.045	8	17 4 10.78	2.7039	27 36 6.8	
9	14 59 21.31	2.5584	22 19 3.8	10.891	9	17 6 53.00	2.7033	27 38 15.9	
10	15 1 54.99	2.5640	22 29 52.6	10.735	10	17 9 35.18	2.7026	27 40 13.1	
11	15 4 29.00	2.5696	22 40 32.0	10.578	11	17 12 17.31	2.7017	27 41 58.4	
12	15 7 3.34	2.5752	22 51 2.0	10.420	12	17 14 59.38	2.7006	27 43 31.8	
13	15 9 38.02	2.5807	23 1 22.4	10.258	13	17 17 41.38	2.6993	27 44 53.3	
14	15 12 13.02	2.5860	23 11 33.0	10.095	14	17 20 23.29	2.6978	27 46 2.9	
15	15 14 48.34	2.5913	23 21 33.8	9.932	15	17 23 5.11	2.6962	27 47 0.7	
16	15 17 23.98	2.5966	23 31 24.8	9.767	16	17 25 46.83	2.6944	27 47 46.7	
17	15 19 59.93	2.6018	23 41 5.8	9.599	17	17 28 28.44	2.6924	27 48 20.9	
18	15 22 36.19	2.6068	23 50 36.7	9.430	18	17 31 9.92	2.6903	27 48 43.3	
19	15 25 12.75	2.6118	23 59 57.4	9.260	19	17 33 51.27	2.6880	27 48 53.9	
20	15 27 49.60	2.6167	24 9 7.9	9.088	20	17 36 32.48	2.6855	27 48 52.8	
21	15 30 26.75	2.6215	24 18 8.0	8.915	21	17 39 13.53	2.6828	27 48 40.0	
22	15 33 4.18	2.6261	24 26 57.7	8.741	22	17 41 54.41	2.6799	27 48 15.6	
23	15 35 41.88	2.6307	24 35 36.9	8.566	23	17 44 35.12	2.6770	27 47 39.5	
24	15 38 19.86	2.6353	S. 24 44 5.6	8.389	24	17 47 15.65	2.6738	S. 27 46 51.9	

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
MONDAY 5.					WEDNESDAY 7.				
	h m s	s	° ' "	"		h m s	s	° ' "	"
0	17 47 15.65	2.6738	S. 27 46 51.9	0.889	0	19 49 28.43	2.3832	S. 23 42 47.3	8.758
1	17 49 55.98	2.6705	27 45 52.8	1.082	1	19 51 51.19	2.3756	23 33 58.0	8.885
2	17 52 36.11	2.6670	27 44 42.1	1.273	2	19 54 13.50	2.3680	23 25 1.1	9.011
3	17 55 16.02	2.6633	27 43 20.0	1.463	3	19 56 35.35	2.3603	23 15 56.7	9.135
4	17 57 55.71	2.6595	27 41 46.5	1.653	4	19 58 56.74	2.3527	23 6 44.9	9.258
5	18 0 35.16	2.6555	27 40 1.7	1.841	5	20 1 17.67	2.3450	22 57 25.8	9.379
6	18 3 14.37	2.6515	27 38 5.6	2.029	6	20 3 38.14	2.3374	22 47 59.4	9.499
7	18 5 53.34	2.6473	27 35 58.2	2.216	7	20 5 58.16	2.3298	22 38 25.9	9.617
8	18 8 32.05	2.6428	27 33 39.7	2.401	8	20 8 17.72	2.3222	22 28 45.4	9.733
9	18 11 10.48	2.6383	27 31 10.1	2.586	9	20 10 36.82	2.3146	22 18 57.9	9.848
10	18 13 48.64	2.6337	27 28 29.4	2.770	10	20 12 55.47	2.3070	22 9 3.6	9.961
11	18 16 26.52	2.6288	27 25 37.7	2.953	11	20 15 13.66	2.2993	21 59 2.6	10.073
12	18 19 4.10	2.6238	27 22 35.1	3.134	12	20 17 31.39	2.2917	21 48 54.9	10.183
13	18 21 41.38	2.6188	27 19 21.6	3.315	13	20 19 48.68	2.2843	21 38 40.7	10.291
14	18 24 18.35	2.6135	27 15 57.3	3.494	14	20 22 5.51	2.2768	21 28 20.0	10.398
15	18 26 55.00	2.6082	27 12 22.3	3.672	15	20 24 21.89	2.2693	21 17 53.0	10.503
16	18 29 31.33	2.6028	27 8 36.7	3.848	16	20 26 37.82	2.2618	21 7 19.7	10.606
17	18 32 7.33	2.5972	27 4 40.5	4.025	17	20 28 53.31	2.2544	20 56 40.3	10.708
18	18 34 42.99	2.5914	27 0 33.7	4.199	18	20 31 8.35	2.2470	20 45 54.8	10.808
19	18 37 18.30	2.5856	26 56 16.6	4.372	19	20 33 22.95	2.2397	20 35 3.3	10.907
20	18 39 53.26	2.5797	26 51 49.1	4.543	20	20 35 37.11	2.2323	20 24 6.0	11.004
21	18 42 27.86	2.5737	26 47 11.4	4.714	21	20 37 50.83	2.2250	20 13 2.8	11.101
22	18 45 2.10	2.5676	26 42 23.4	4.884	22	20 40 4.11	2.2177	20 1 53.9	11.194
23	18 47 35.97	2.5613	S. 26 37 25.3	5.052	23	20 42 16.95	2.2104	S. 19 50 39.5	11.287
TUESDAY 6.					THURSDAY 8.				
0	18 50 9.46	2.5549	S. 26 32 17.2	5.218	0	20 44 29.36	2.2033	S. 19 39 19.5	11.378
1	18 52 42.56	2.5485	26 26 59.2	5.383	1	20 46 41.34	2.1962	19 27 54.1	11.468
2	18 55 15.28	2.5420	26 21 31.3	5.546	2	20 48 52.90	2.1891	19 16 23.4	11.556
3	18 57 47.60	2.5353	26 15 53.7	5.708	3	20 51 4.03	2.1820	19 4 47.4	11.643
4	19 0 19.52	2.5287	26 10 6.3	5.869	4	20 53 14.74	2.1750	18 53 6.2	11.728
5	19 2 51.04	2.5219	26 4 9.4	6.028	5	20 55 25.03	2.1681	18 41 20.0	11.812
6	19 5 22.15	2.5151	25 58 3.0	6.185	6	20 57 34.91	2.1612	18 29 28.8	11.894
7	19 7 52.85	2.5083	25 51 47.2	6.342	7	20 59 44.37	2.1543	18 17 32.7	11.975
8	19 10 23.14	2.5013	25 45 22.0	6.497	8	21 1 53.42	2.1475	18 5 31.8	12.054
9	19 12 53.00	2.4942	25 38 47.6	6.649	9	21 4 2.07	2.1408	17 53 26.2	12.132
10	19 15 22.44	2.4872	25 32 4.1	6.801	10	21 6 10.32	2.1342	17 41 16.0	12.208
11	19 17 51.46	2.4800	25 25 11.5	6.952	11	21 8 18.17	2.1275	17 29 1.2	12.284
12	19 20 20.04	2.4727	25 18 9.9	7.100	12	21 10 25.62	2.1209	17 16 41.9	12.358
13	19 22 48.18	2.4654	25 10 59.5	7.247	13	21 12 32.68	2.1143	17 4 18.3	12.429
14	19 25 15.89	2.4582	25 3 40.3	7.393	14	21 14 39.36	2.1081	16 51 50.4	12.501
15	19 27 43.16	2.4508	24 56 12.4	7.536	15	21 16 45.65	2.1017	16 39 18.2	12.570
16	19 30 9.99	2.4434	24 48 36.0	7.678	16	21 18 51.56	2.0953	16 26 42.0	12.638
17	19 32 36.37	2.4359	24 40 51.1	7.818	17	21 20 57.09	2.0891	16 14 1.7	12.705
18	19 35 2.30	2.4285	24 32 57.8	7.958	18	21 23 2.25	2.0829	16 1 17.4	12.770
19	19 37 27.79	2.4210	24 24 56.2	8.095	19	21 25 7.04	2.0768	15 48 29.3	12.833
20	19 39 52.82	2.4134	24 16 46.4	8.231	20	21 27 11.47	2.0708	15 35 37.4	12.896
21	19 42 17.40	2.4059	24 8 28.5	8.364	21	21 29 15.53	2.0647	15 22 41.8	12.958
22	19 44 41.53	2.3984	24 0 2.7	8.497	22	21 31 19.23	2.0588	15 9 42.5	13.018
23	19 47 5.21	2.3908	23 51 28.9	8.628	23	21 33 22.58	2.0530	14 56 39.6	13.077
24	19 49 28.43	2.3832	S. 23 42 47.3	8.758	24	21 35 25.59	2.0473	S. 14 43 33.3	13.133

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.
FRIDAY 9.					SUNDAY 11.			
0	h m s	s	° ' "	"	0	h m s	s	° ' "
0	21 35 25.59	2.0473	S. 14 43 33.3	13.133	0	23 8 26.46	1.8575	S. 3 29 35.9
1	21 37 28.25	2.0415	14 30 23.6	13.189	1	23 10 17.85	1.8555	3 15 4.1
2	21 39 30.57	2.0358	14 17 10.6	13.244	2	23 12 9.12	1.8534	3 0 32.0
3	21 41 32.55	2.0303	14 3 54.3	13.298	3	23 14 0.26	1.8514	2 45 59.8
4	21 43 34.20	2.0248	13 50 34.8	13.351	4	23 15 51.29	1.8496	2 31 27.6
5	21 45 35.53	2.0194	13 37 12.2	13.401	5	23 17 42.21	1.8478	2 16 55.3
6	21 47 36.53	2.0140	13 23 46.6	13.451	6	23 19 33.03	1.8461	2 2 23.1
7	21 49 37.21	2.0088	13 10 18.0	13.500	7	23 21 23.74	1.8444	1 47 50.9
8	21 51 37.58	2.0036	12 56 46.6	13.547	8	23 23 14.36	1.8429	1 33 18.9
9	21 53 37.64	1.9984	12 43 12.4	13.593	9	23 25 4.89	1.8413	1 18 47.0
10	21 55 37.39	1.9933	12 29 35.4	13.639	10	23 26 55.32	1.8399	1 4 15.4
11	21 57 36.84	1.9883	12 15 55.7	13.683	11	23 28 45.68	1.8386	0 49 44.1
12	21 59 35.99	1.9834	12 2 13.5	13.724	12	23 30 35.95	1.8373	0 35 13.2
13	22 1 34.85	1.9786	11 48 28.8	13.766	13	23 32 26.15	1.8361	0 20 42.7
14	22 3 33.42	1.9738	11 34 41.6	13.806	14	23 34 16.28	1.8349	S. 0 6 12.6
15	22 5 31.71	1.9693	11 20 52.1	13.844	15	23 36 6.34	1.8338	N. 0 8 17.0
16	22 7 29.73	1.9647	11 7 0.3	13.883	16	23 37 56.34	1.8328	0 22 46.0
17	22 9 27.47	1.9601	10 53 6.2	13.920	17	23 39 46.28	1.8318	0 37 14.4
18	22 11 24.94	1.9556	10 39 9.9	13.955	18	23 41 36.16	1.8310	0 51 42.1
19	22 13 22.14	1.9511	10 25 11.6	13.989	19	23 43 26.00	1.8303	1 6 9.1
20	22 15 19.08	1.9469	10 11 11.2	14.023	20	23 45 15.79	1.8295	1 20 35.3
21	22 17 15.77	1.9428	9 57 8.8	14.055	21	23 47 5.54	1.8288	1 35 0.7
22	22 19 12.21	1.9386	9 43 4.6	14.086	22	23 48 55.25	1.8283	1 49 25.2
23	22 21 8.40	1.9345	S. 9 28 58.5	14.117	23	23 50 44.93	1.8278	N. 2 3 48.8
SATURDAY 10.					MONDAY 12.			
0	22 23 4.35	1.9305	S. 9 14 50.6	14.145	0	23 52 34.58	1.8273	N. 2 18 11.4
1	22 25 0.06	1.9266	9 0 41.1	14.173	1	23 54 24.20	1.8268	2 32 32.9
2	22 26 55.54	1.9228	8 46 29.9	14.199	2	23 56 13.80	1.8266	2 46 53.4
3	22 28 50.79	1.9190	8 32 17.2	14.225	3	23 58 3.39	1.8263	3 1 12.7
4	22 30 45.82	1.9153	8 18 2.9	14.250	4	23 59 52.96	1.8261	3 15 30.8
5	22 32 40.63	1.9117	8 3 47.2	14.273	5	0 1 42.53	1.8261	3 29 47.7
6	22 34 35.22	1.9081	7 49 30.1	14.296	6	0 3 32.09	1.8260	3 44 3.3
7	22 36 29.60	1.9047	7 35 11.7	14.318	7	0 5 21.65	1.8260	3 58 17.5
8	22 38 23.78	1.9013	7 20 52.0	14.338	8	0 7 11.21	1.8260	4 12 30.4
9	22 40 17.76	1.8980	7 6 31.2	14.357	9	0 9 0.77	1.8261	4 26 41.8
10	22 42 11.54	1.8948	6 52 9.2	14.376	10	0 10 50.35	1.8264	4 40 51.7
11	22 44 5.13	1.8916	6 37 46.1	14.393	11	0 12 39.94	1.8268	4 55 0.1
12	22 45 58.53	1.8885	6 23 22.0	14.409	12	0 14 29.56	1.8271	5 9 6.8
13	22 47 51.75	1.8856	6 8 57.0	14.424	13	0 16 19.20	1.8275	5 23 11.5
14	22 49 44.80	1.8827	5 54 31.1	14.439	14	0 18 8.86	1.8279	5 37 15.3
15	22 51 37.67	1.8798	5 40 4.3	14.453	15	0 19 58.55	1.8285	5 51 16.5
16	22 53 30.37	1.8770	5 25 36.8	14.464	16	0 21 48.28	1.8291	6 5 16.8
17	22 55 22.91	1.8743	5 11 8.6	14.476	17	0 23 38.05	1.8298	6 19 14.8
18	22 57 15.29	1.8717	4 56 39.7	14.487	18	0 25 27.86	1.8305	6 33 10.5
19	22 59 7.51	1.8691	4 42 10.2	14.496	19	0 27 17.71	1.8313	6 47 5.0
20	23 0 59.58	1.8667	4 27 40.2	14.504	20	0 29 7.61	1.8321	7 0 57.2
21	23 2 51.51	1.8643	4 13 9.7	14.512	21	0 30 57.57	1.8331	7 14 47.3
22	23 4 43.30	1.8620	3 58 38.8	14.518	22	0 32 47.58	1.8340	7 28 35.3
23	23 6 34.95	1.8597	3 44 7.5	14.524	23	0 34 37.65	1.8350	7 42 21.2
24	23 8 26.46	1.8575	S. 3 29 35.9	14.528	24	0 36 27.78	1.8361	N. 7 56 4.8

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
TUESDAY 13.					THURSDAY 15.				
0	h m s	s	° ' "	"	0	h m s	s	° ' "	"
1	0 36 27.78	1.8361	N. 7 56 4.8	13.708	1	2 6 52.10	1.9486	N. 17 55 41.0	10.958
2	0 38 17.98	1.8373	8 9 46.2	13.671	2	2 8 49.11	1.9519	18 6 36.1	10.880
3	0 40 8.25	1.8385	8 23 25.3	13.633	3	2 10 46.33	1.9553	18 17 26.6	10.802
4	0 41 58.60	1.8398	8 37 2.1	13.593	4	2 12 43.75	1.9587	18 28 12.3	10.723
5	0 43 49.02	1.8411	8 50 36.4	13.552	5	2 14 41.37	1.9621	18 38 53.3	10.643
6	0 45 39.53	1.8425	9 4 8.3	13.512	6	2 16 39.20	1.9656	18 49 29.4	10.562
7	0 47 30.12	1.8439	9 17 37.8	13.470	7	2 18 37.24	1.9691	19 0 0.7	10.481
8	0 49 20.80	1.8454	9 31 4.7	13.426	8	2 20 35.49	1.9726	19 10 27.1	10.398
9	0 51 11.57	1.8469	9 44 28.9	13.383	9	2 22 33.95	1.9761	19 20 48.4	10.314
10	0 53 2.43	1.8485	9 57 50.6	13.338	10	2 24 32.62	1.9796	19 31 4.8	10.231
11	0 54 53.39	1.8502	10 11 9.5	13.293	11	2 26 31.50	1.9831	19 41 16.1	10.146
12	0 56 44.45	1.8519	10 24 25.7	13.247	12	2 28 30.59	1.9867	19 51 22.3	10.060
13	0 58 35.62	1.8537	10 37 39.1	13.199	13	2 30 29.90	1.9903	20 1 23.3	9.973
14	1 0 26.89	1.8555	10 50 49.6	13.152	14	2 32 29.43	1.9939	20 11 19.1	9.886
15	1 2 18.28	1.8574	11 3 57.3	13.103	15	2 34 29.17	1.9975	20 21 9.6	9.798
16	1 4 9.78	1.8593	11 17 2.0	13.053	16	2 36 29.13	2.0012	20 30 54.9	9.710
17	1 6 1.40	1.8613	11 30 3.7	13.003	17	2 38 29.31	2.0048	20 40 34.8	9.620
18	1 7 53.13	1.8633	11 43 2.4	12.952	18	2 40 29.71	2.0085	20 50 9.3	9.529
19	1 9 44.99	1.8654	11 55 57.9	12.899	19	2 42 30.33	2.0122	20 59 38.3	9.438
20	1 11 36.98	1.8676	12 8 50.3	12.847	20	2 44 31.17	2.0158	21 9 1.8	9.346
21	1 13 29.10	1.8698	12 21 39.6	12.794	21	2 46 32.23	2.0196	21 18 19.8	9.253
22	1 15 21.35	1.8719	12 34 25.6	12.739	22	2 48 33.52	2.0233	21 27 32.2	9.159
23	1 17 13.73	1.8742	12 47 8.3	12.684	23	2 50 35.03	2.0270	21 36 38.9	9.065
24	1 19 6.25	1.8766	N. 12 59 47.7	12.628	24	2 52 36.76	2.0307	N. 21 45 40.0	8.970
WEDNESDAY 14.					FRIDAY 16.				
0	1 20 58.92	1.8790	N. 13 12 23.6	12.570	0	2 54 38.71	2.0344	N. 21 54 35.3	8.873
1	1 22 51.73	1.8814	13 24 56.1	12.513	1	2 56 40.89	2.0382	22 3 24.8	8.777
2	1 24 44.09	1.8838	13 37 25.1	12.454	2	2 58 43.29	2.0421	22 12 8.5	8.680
3	1 26 37.79	1.8863	13 49 50.6	12.395	3	3 0 45.91	2.0456	22 20 46.4	8.582
4	1 28 31.05	1.8889	14 2 12.5	12.335	4	3 2 48.76	2.0493	22 29 18.3	8.483
5	1 30 24.46	1.8915	14 14 30.8	12.274	5	3 4 51.83	2.0530	22 37 44.3	8.383
6	1 32 18.03	1.8943	14 26 45.4	12.212	6	3 6 55.12	2.0568	22 46 4.2	8.282
7	1 34 11.77	1.8970	14 38 56.2	12.149	7	3 8 58.64	2.0605	22 54 18.1	8.180
8	1 36 5.67	1.8997	14 51 3.3	12.086	8	3 11 2.38	2.0642	23 2 25.8	8.078
9	1 37 59.73	1.9024	15 3 6.5	12.022	9	3 13 6.34	2.0678	23 10 27.4	7.976
10	1 39 53.06	1.9053	15 15 5.9	11.957	10	3 15 10.52	2.0716	23 18 22.9	7.873
11	1 41 48.36	1.9081	15 27 1.3	11.890	11	3 17 14.93	2.0753	23 26 12.1	7.768
12	1 43 42.93	1.9110	15 38 52.7	11.823	12	3 19 19.56	2.0790	23 33 55.0	7.663
13	1 45 37.68	1.9139	15 50 40.1	11.756	13	3 21 24.41	2.0826	23 41 31.6	7.557
14	1 47 32.60	1.9169	16 2 23.4	11.688	14	3 23 29.47	2.0863	23 49 1.8	7.450
15	1 49 27.71	1.9200	16 14 2.6	11.618	15	3 25 34.76	2.0899	23 56 25.6	7.343
16	1 51 23.00	1.9230	16 25 37.6	11.548	16	3 27 40.26	2.0935	24 3 43.0	7.236
17	1 53 18.47	1.9261	16 37 8.3	11.477	17	3 29 45.98	2.0971	24 10 53.9	7.127
18	1 55 14.13	1.9293	16 48 34.8	11.405	18	3 31 51.91	2.1007	24 17 58.2	7.017
19	1 57 9.98	1.9323	16 59 56.9	11.333	19	3 33 58.06	2.1043	24 24 55.9	6.907
20	1 59 6.01	1.9355	17 11 14.7	11.259	20	3 36 4.42	2.1078	24 31 47.0	6.797
21	2 1 2.24	1.9388	17 22 28.0	11.185	21	3 38 10.99	2.1113	24 38 31.5	6.686
22	2 2 58.66	1.9420	17 33 36.9	11.110	22	3 40 17.77	2.1148	24 45 9.3	6.573
23	2 4 55.28	1.9453	17 44 41.2	11.034	23	3 42 24.76	2.1183	24 51 40.3	6.460
24	2 6 52.10	1.9486	N. 17 55 41.0	10.958	24	3 44 31.96	2.1218	N. 24 58 4.5	6.347

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
SATURDAY 17.					MONDAY 19.				
0	h m s	s	N. 24 58 4.5	6.347	0	h m s	s	N. 27 41 26.5	0.393
1	3 44 31.96	2.1218	25 4 21.9	6.233	1	5 29 32.78	2.2399	27 41 40.0	0.158
2	3 46 39.37	2.1252	25 10 32.4	6.118	2	5 31 46.78	2.2338	27 41 45.5	+0.003
3	3 48 46.98	2.1285	25 16 36.0	6.003	3	5 34 0.83	2.2346	27 41 42.9	-0.111
4	3 50 54.79	2.1318	25 22 32.7	5.887	4	5 36 14.93	2.2353	27 41 32.2	0.247
5	3 53 2.80	2.1352	25 28 22.4	5.770	5	5 38 29.07	2.2359	27 41 13.3	0.382
6	3 55 11.01	2.1385	25 34 5.1	5.653	6	5 40 43.24	2.2364	27 40 46.4	0.516
7	3 57 19.42	2.1418	25 39 40.7	5.535	7	5 42 57.44	2.2369	27 40 11.4	0.651
8	3 59 28.02	2.1449	25 45 9.3	5.417	8	5 45 11.67	2.2373	27 39 28.3	0.787
9	4 1 36.81	2.1481	25 50 30.7	5.298	9	5 47 25.92	2.2377	27 38 37.0	0.923
10	4 3 45.79	2.1513	25 55 45.0	5.178	10	5 49 40.19	2.2379	27 37 37.6	1.058
11	4 5 54.96	2.1543	26 0 52.1	5.058	11	5 51 54.47	2.2381	27 36 30.1	1.193
12	4 8 4.31	2.1574	26 5 51.9	4.937	12	5 54 8.76	2.2383	27 35 14.5	1.328
13	4 10 13.85	2.1605	26 10 44.5	4.815	13	5 56 23.06	2.2383	27 33 50.8	1.463
14	4 12 23.57	2.1634	26 15 29.7	4.693	14	5 58 37.36	2.2383	27 32 18.9	1.599
15	4 14 33.46	2.1663	26 20 7.6	4.571	15	6 0 51.66	2.2383	27 30 38.9	1.734
16	4 16 43.53	2.1693	26 24 38.2	4.448	16	6 3 5.95	2.2381	27 28 50.8	1.869
17	4 18 53.77	2.1721	26 29 1.4	4.324	17	6 5 20.23	2.2379	27 26 54.6	2.004
18	4 21 4.18	2.1749	26 33 17.1	4.200	18	6 7 34.50	2.2377	27 24 50.3	2.139
19	4 23 14.76	2.1777	26 37 25.4	4.076	19	6 9 48.75	2.2373	27 22 37.9	2.275
20	4 25 25.50	2.1804	26 41 26.2	3.951	20	6 12 2.98	2.2369	27 20 17.3	2.410
21	4 27 36.41	2.1831	26 45 19.5	3.825	21	6 14 17.18	2.2364	27 17 48.7	2.544
22	4 29 47.47	2.1856	26 49 5.2	3.698	22	6 16 31.35	2.2359	27 15 12.0	2.679
23	4 31 58.68	2.1882	N. 26 52 43.3	3.573	23	6 18 45.49	2.2353	N. 27 12 27.2	2.814
24	4 34 10.05	2.1907				6 20 59.59	2.2347		
SUNDAY 18.					TUESDAY 20.				
0	4 36 21.56	2.1930	N. 26 56 13.9	3.446	0	6 23 13.65	2.2340	N. 27 9 34.3	2.948
1	4 38 33.21	2.1954	26 59 36.8	3.319	1	6 25 27.67	2.2333	27 6 33.4	3.083
2	4 40 45.01	2.1978	27 2 52.1	3.191	2	6 27 41.64	2.2323	27 3 24.4	3.218
3	4 42 56.94	2.2000	27 5 59.7	3.063	3	6 29 55.55	2.2314	27 0 7.3	3.352
4	4 45 9.01	2.2023	27 8 59.6	2.933	4	6 32 9.41	2.2305	26 56 42.2	3.485
5	4 47 21.21	2.2044	27 11 51.7	2.804	5	6 34 23.21	2.2295	26 53 9.1	3.618
6	4 49 33.54	2.2065	27 14 36.1	2.675	6	6 36 36.95	2.2284	26 49 28.0	3.752
7	4 51 45.99	2.2085	27 17 12.7	2.545	7	6 38 50.62	2.2273	26 45 38.9	3.885
8	4 53 58.56	2.2104	27 19 41.5	2.415	8	6 41 4.22	2.2261	26 41 41.8	4.018
9	4 56 11.24	2.2123	27 22 2.5	2.284	9	6 43 17.75	2.2248	26 37 36.7	4.151
10	4 58 24.04	2.2142	27 24 15.6	2.153	10	6 45 31.20	2.2236	26 33 23.7	4.283
11	5 0 36.94	2.2159	27 26 20.9	2.023	11	6 47 44.58	2.2223	26 29 2.7	4.416
12	5 2 49.95	2.2177	27 28 18.3	1.891	12	6 49 57.87	2.2208	26 24 33.8	4.548
13	5 5 3.06	2.2193	27 30 7.8	1.759	13	6 52 11.08	2.2194	26 19 57.0	4.679
14	5 7 16.27	2.2209	27 31 49.4	1.628	14	6 54 24.20	2.2179	26 15 12.3	4.811
15	5 9 29.57	2.2224	27 33 23.1	1.495	15	6 56 37.23	2.2163	26 10 19.7	4.942
16	5 11 42.96	2.2238	27 34 48.8	1.362	16	6 58 50.16	2.2148	26 5 19.3	5.073
17	5 13 56.43	2.2252	27 36 6.5	1.229	17	7 1 3.00	2.2132	26 0 11.0	5.203
18	5 16 9.98	2.2265	27 37 16.3	1.097	18	7 3 15.74	2.2114	25 54 54.9	5.333
19	5 18 23.61	2.2278	27 38 18.1	0.963	19	7 5 28.37	2.2097	25 49 31.0	5.463
20	5 20 37.32	2.2290	27 39 11.8	0.829	20	7 7 40.90	2.2080	25 43 59.4	5.592
21	5 22 51.09	2.2301	27 39 57.6	0.696	21	7 9 53.33	2.2063	25 38 20.0	5.722
22	5 25 4.93	2.2312	27 40 35.3	0.561	22	7 12 5.65	2.2043	25 32 32.9	5.850
23	5 27 18.83	2.2321	27 41 4.9	0.427	23	7 14 17.85	2.2024	25 26 38.0	5.978
24	5 29 32.78	2.2329	N. 27 41 26.5	0.293	24	7 16 29.94	2.2005	N. 25 20 35.5	6.105

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

R.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
WEDNESDAY 21.					FRIDAY 23.				
	^h ^m ^s	^s	[°] ['] ["]	["]		^h ^m ^s	^s	[°] ['] ["]	["]
7	16 29.94	2.3005	N. 25 20 35.5	6.105	0	8 59 34.18	2.0937	N. 18 9 45.3	11.621
7	18 41.91	2.1986	25 14 25.4	6.333	1	9 1 39.74	2.0917	17 58 5.1	11.720
7	20 53.77	2.1967	25 8 7.6	6.360	2	9 3 45.18	2.0898	17 46 18.9	11.819
7	23 5.51	2.1947	25 1 42.2	6.487	3	9 5 50.51	2.0879	17 34 26.8	11.917
7	25 17.13	2.1926	24 55 9.2	6.613	4	9 7 55.73	2.0860	17 22 28.9	12.013
7	27 28.62	2.1905	24 48 28.7	6.738	5	9 10 0.83	2.0841	17 10 25.2	12.110
7	29 39.99	2.1884	24 41 40.6	6.864	6	9 12 5.82	2.0823	16 58 15.7	12.206
7	31 51.23	2.1863	24 34 45.0	6.988	7	9 14 10.71	2.0807	16 46 0.5	12.300
7	34 2.34	2.1841	24 27 42.0	7.113	8	9 16 15.50	2.0789	16 33 39.7	12.394
7	36 13.32	2.1819	24 20 31.5	7.237	9	9 18 20.18	2.0772	16 21 13.2	12.488
7	38 24.17	2.1798	24 13 13.6	7.360	10	9 20 24.76	2.0756	16 8 41.2	12.580
7	40 34.89	2.1775	24 5 48.3	7.483	11	9 22 29.25	2.0740	15 56 3.6	12.672
7	42 45.47	2.1753	23 58 15.6	7.606	12	9 24 33.64	2.0724	15 43 20.6	12.763
7	44 55.92	2.1730	23 50 35.6	7.728	13	9 26 37.94	2.0709	15 30 32.1	12.853
7	47 6.23	2.1707	23 42 48.3	7.848	14	9 28 42.15	2.0695	15 17 38.3	12.942
7	49 16.40	2.1684	23 34 53.8	7.969	15	9 30 46.28	2.0681	15 4 39.1	13.030
7	51 26.44	2.1662	23 26 52.0	8.090	16	9 32 50.32	2.0667	14 51 34.7	13.118
7	53 36.34	2.1638	23 18 43.0	8.209	17	9 34 54.28	2.0654	14 38 25.0	13.204
7	55 46.10	2.1615	23 10 26.9	8.328	18	9 36 58.17	2.0642	14 25 10.2	13.290
7	57 55.72	2.1592	23 2 3.6	8.448	19	9 39 1.98	2.0629	14 11 50.2	13.376
8	0 5.20	2.1568	22 53 33.2	8.565	20	9 41 5.72	2.0618	13 58 25.1	13.460
8	2 14.54	2.1545	22 44 55.8	8.683	21	9 43 9.39	2.0607	13 44 55.0	13.543
8	4 23.74	2.1521	22 36 11.3	8.800	22	9 45 13.00	2.0596	13 31 19.9	13.626
8	6 32.79	2.1497	N. 22 27 19.8	8.917	23	9 47 16.54	2.0585	N. 13 17 39.9	13.708
THURSDAY 22.					SATURDAY 24.				
8	8 41.70	2.1473	N. 22 18 21.3	9.033	0	9 49 20.02	2.0576	N. 13 3 55.0	13.788
8	10 50.47	2.1450	22 9 15.9	9.148	1	9 51 23.45	2.0568	12 50 5.3	13.868
8	12 59.10	2.1427	22 0 3.6	9.262	2	9 53 26.83	2.0559	12 36 10.8	13.948
8	15 7.59	2.1403	21 50 44.5	9.376	3	9 55 30.16	2.0552	12 22 11.6	14.025
8	17 15.94	2.1380	21 41 18.5	9.489	4	9 57 33.45	2.0544	12 8 7.8	14.102
8	19 24.15	2.1356	21 31 45.8	9.602	5	9 59 36.69	2.0538	11 53 59.4	14.178
8	21 32.21	2.1333	21 22 6.3	9.714	6	10 1 39.90	2.0532	11 39 46.4	14.254
8	23 40.14	2.1309	21 12 20.1	9.826	7	10 3 43.07	2.0526	11 25 28.9	14.329
8	25 47.92	2.1286	21 2 27.2	9.938	8	10 5 46.21	2.0522	11 11 6.9	14.403
8	27 55.57	2.1263	20 52 27.6	10.048	9	10 7 49.33	2.0518	10 56 40.6	14.474
8	30 3.08	2.1240	20 42 21.5	10.157	10	10 9 52.42	2.0514	10 42 10.0	14.546
8	32 10.45	2.1217	20 32 8.8	10.266	11	10 11 55.50	2.0512	10 27 35.1	14.617
8	34 17.68	2.1194	20 21 49.6	10.374	12	10 13 58.56	2.0509	10 12 56.0	14.687
8	36 24.78	2.1172	20 11 23.9	10.482	13	10 16 1.61	2.0508	9 58 12.7	14.755
8	38 31.74	2.1149	20 0 51.8	10.588	14	10 18 4.65	2.0507	9 43 25.4	14.823
8	40 38.57	2.1127	19 50 13.3	10.695	15	10 20 7.69	2.0508	9 28 34.0	14.889
8	42 45.26	2.1104	19 39 28.4	10.801	16	10 22 10.74	2.0508	9 13 38.7	14.954
8	44 51.82	2.1083	19 28 37.2	10.906	17	10 24 13.79	2.0508	8 58 39.5	15.019
8	46 58.25	2.1061	19 17 39.7	11.010	18	10 26 16.84	2.0510	8 43 36.4	15.083
8	49 4.55	2.1040	19 6 36.0	11.113	19	10 28 19.91	2.0513	8 28 29.5	15.147
8	51 10.73	2.1019	18 55 26.1	11.217	20	10 30 23.00	2.0517	8 13 18.8	15.208
8	53 16.78	2.0998	18 44 10.0	11.319	21	10 32 26.11	2.0521	7 58 4.5	15.268
8	55 22.70	2.0977	18 32 47.8	11.420	22	10 34 29.25	2.0526	7 42 46.7	15.327
8	57 28.50	2.0957	18 21 19.6	11.521	23	10 36 32.42	2.0531	7 27 25.3	15.386
8	59 34.18	2.0937	N. 18 9 45.3	11.621	24	10 38 35.62	2.0537	N. 7 12 0.4	15.443

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
SUNDAY 25.					TUESDAY 27.				
	h m s	s	° ' "	"		h m s	s	° ' "	"
0	10 38 35.62	2.0537	N. 7 12 0.4	15.443	0	12 19 25.44	2.1800	S. 5 51 7.3	16.635
1	10 40 38.86	2.0544	6 56 32.2	15.498	1	12 21 36.38	2.1848	6 7 45.0	16.621
2	10 42 42.15	2.0553	6 41 0.6	15.553	2	12 23 47.61	2.1895	6 24 21.8	16.606
3	10 44 45.49	2.0561	6 25 25.8	15.608	3	12 25 59.12	2.1943	6 40 57.7	16.589
4	10 46 48.88	2.0570	6 9 47.7	15.661	4	12 28 10.93	2.1993	6 57 32.5	16.569
5	10 48 52.33	2.0580	5 54 6.5	15.712	5	12 30 23.04	2.2044	7 14 6.0	16.548
6	10 50 55.84	2.0590	5 38 22.3	15.762	6	12 32 35.46	2.2097	7 30 38.2	16.525
7	10 52 59.42	2.0603	5 22 35.1	15.811	7	12 34 48.20	2.2149	7 47 9.0	16.500
8	10 55 3.08	2.0616	5 6 45.0	15.858	8	12 37 1.25	2.2202	8 3 38.2	16.473
9	10 57 6.81	2.0628	4 50 52.1	15.905	9	12 39 14.62	2.2255	8 20 5.8	16.445
10	10 59 10.62	2.0642	4 34 56.4	15.952	10	12 41 28.31	2.2310	8 36 31.6	16.413
11	11 1 14.51	2.0657	4 18 57.9	15.996	11	12 43 42.34	2.2366	8 52 55.4	16.380
12	11 3 18.50	2.0673	4 2 56.9	16.038	12	12 45 56.70	2.2422	9 9 17.2	16.346
13	11 5 22.59	2.0690	3 46 53.3	16.080	13	12 48 11.40	2.2479	9 25 36.9	16.309
14	11 7 26.78	2.0707	3 30 47.3	16.120	14	12 50 26.45	2.2538	9 41 54.3	16.271
15	11 9 31.07	2.0724	3 14 38.9	16.160	15	12 52 41.85	2.2596	9 58 9.4	16.230
16	11 11 35.47	2.0743	2 58 28.1	16.198	16	12 54 57.60	2.2655	10 14 21.9	16.186
17	11 13 39.99	2.0763	2 42 15.1	16.234	17	12 57 13.71	2.2715	10 30 31.7	16.141
18	11 15 44.63	2.0784	2 26 0.0	16.269	18	12 59 30.18	2.2776	10 46 38.8	16.094
19	11 17 49.40	2.0806	2 9 42.8	16.303	19	13 1 47.02	2.2838	11 2 43.0	16.045
20	11 19 54.30	2.0828	1 53 23.6	16.336	20	13 4 4.23	2.2899	11 18 44.2	15.995
21	11 21 59.33	2.0850	1 37 2.5	16.368	21	13 6 21.81	2.2963	11 34 42.2	15.939
22	11 24 4.50	2.0874	1 20 39.5	16.398	22	13 8 39.78	2.3027	11 50 36.9	15.883
23	11 26 9.82	2.0899	N. 1 4 14.8	16.426	23	13 10 58.13	2.3090	S. 12 6 28.2	15.826
MONDAY 26.					WEDNESDAY 28.				
	h m s	s	° ' "	"		h m s	s	° ' "	"
0	11 28 15.29	2.0925	N. 0 47 48.4	16.453	0	13 13 16.86	2.3155	S. 12 22 16.0	15.767
1	11 30 20.92	2.0952	0 31 20.4	16.478	1	13 15 35.99	2.3221	12 38 0.2	15.704
2	11 32 26.71	2.0978	N. 0 14 51.0	16.502	2	13 17 55.51	2.3288	12 53 40.5	15.639
3	11 34 32.66	2.1007	S. 0 1 39.8	16.525	3	13 20 15.44	2.3355	13 9 16.9	15.573
4	11 36 38.79	2.1036	0 18 12.0	16.547	4	13 22 35.77	2.3422	13 24 49.2	15.503
5	11 38 45.09	2.1066	0 34 45.4	16.566	5	13 24 56.50	2.3489	13 40 17.3	15.433
6	11 40 51.58	2.1097	0 51 19.9	16.584	6	13 27 17.64	2.3558	13 55 41.1	15.359
7	11 42 58.25	2.1128	1 7 55.5	16.601	7	13 29 39.20	2.3628	14 11 0.4	15.283
8	11 45 5.12	2.1161	1 24 32.0	16.616	8	13 32 1.17	2.3697	14 26 15.1	15.205
9	11 47 12.18	2.1194	1 41 9.4	16.630	9	13 34 23.56	2.3767	14 41 25.0	15.125
10	11 49 19.45	2.1228	1 57 47.6	16.642	10	13 36 46.37	2.3837	14 56 30.1	15.043
11	11 51 26.92	2.1263	2 14 26.4	16.652	11	13 39 9.60	2.3908	15 11 30.1	14.958
12	11 53 34.61	2.1300	2 31 5.8	16.661	12	13 41 33.26	2.3979	15 26 25.0	14.871
13	11 55 42.52	2.1337	2 47 45.7	16.668	13	13 43 57.35	2.4051	15 41 14.6	14.782
14	11 57 50.65	2.1374	3 4 26.0	16.673	14	13 46 21.87	2.4123	15 55 58.8	14.690
15	11 59 59.01	2.1413	3 21 6.5	16.677	15	13 48 46.83	2.4196	16 10 37.4	14.596
16	12 2 7.61	2.1453	3 37 47.2	16.679	16	13 51 12.22	2.4268	16 25 10.3	14.500
17	12 4 16.45	2.1493	3 54 28.0	16.680	17	13 53 38.05	2.4342	16 39 37.4	14.409
18	12 6 25.53	2.1534	4 11 8.8	16.679	18	13 56 4.32	2.4415	16 53 58.5	14.300
19	12 8 34.86	2.1576	4 27 49.5	16.676	19	13 58 31.03	2.4488	17 8 13.4	14.196
20	12 10 44.44	2.1619	4 44 29.9	16.671	20	14 0 58.18	2.4562	17 22 22.0	14.091
21	12 12 54.29	2.1663	5 1 10.0	16.665	21	14 3 25.77	2.4636	17 36 24.3	13.983
22	12 15 4.40	2.1708	5 17 49.7	16.657	22	14 5 53.81	2.4710	17 50 20.0	13.873
23	12 17 14.78	2.1753	5 34 28.8	16.647	23	14 8 22.29	2.4784	18 4 9.0	13.760
24	12 19 25.44	2.1800	S. 5 51 7.3	16.635	24	14 10 51.22	2.4858	S. 18 17 51.2	13.646

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
THURSDAY 29.				SATURDAY, MAY 1.				
h m s	s	° ' "	"	o	h m s	s	° ' "	"
14 10 51.22	2.4858	S. 18 17 51.2	13.646	16 17 57.54	2.7746	S. 26 19 21.4	5.698	
14 13 20.59	2.4933	18 31 26.5	13.529					
14 15 50.41	2.5008	18 44 54.6	13.408					
14 18 20.68	2.5082	18 58 15.5	13.287					
14 20 51.39	2.5155	19 11 29.0	13.163					
14 23 22.54	2.5229	19 24 35.0	13.036					
14 25 54.14	2.5304	19 37 33.3	12.908					
14 28 26.19	2.5378	19 50 23.9	12.777					
14 30 58.68	2.5452	20 3 6.5	12.643					
14 33 31.61	2.5524	20 15 41.1	12.508					
14 36 4.97	2.5598	20 28 7.4	12.369					
14 38 38.78	2.5671	20 40 25.4	12.230					
14 41 13.02	2.5743	20 52 35.0	12.088					
14 43 47.70	2.5815	21 4 36.0	11.943					
14 46 22.80	2.5887	21 16 28.2	11.797					
14 48 58.34	2.5958	21 28 11.6	11.648					
14 51 34.30	2.6028	21 39 46.0	11.497					
14 54 10.68	2.6098	21 51 11.2	11.343					
14 56 47.48	2.6168	22 2 27.2	11.188					
14 59 24.70	2.6238	22 13 33.8	11.031					
15 2 2.33	2.6305	22 24 30.9	10.872					
15 4 40.36	2.6372	22 35 18.4	10.711					
15 7 18.79	2.6438	22 45 56.2	10.548					
15 9 57.62	2.6504	S. 22 56 24.1	10.382					
FRIDAY 30.				PHASES OF THE MOON.				
h m s	s	° ' "	"					
15 12 36.84	2.6569	S. 23 6 42.0	10.214					
15 15 16.45	2.6633	23 16 49.8	10.045					
15 17 56.44	2.6696	23 26 47.4	9.873					
15 20 36.80	2.6758	23 36 34.6	9.700					
15 23 17.53	2.6818	23 46 11.4	9.526					
15 25 58.62	2.6878	23 55 37.7	9.348					
15 28 40.07	2.6937	24 4 53.2	9.169					
15 31 21.86	2.6994	24 13 58.0	8.990					
15 34 4.00	2.7051	24 22 52.0	8.808					
15 36 46.47	2.7105	24 31 34.9	8.623					
15 39 29.26	2.7158	24 40 6.8	8.438					
15 42 12.37	2.7211	24 48 27.5	8.252					
15 44 55.79	2.7262	24 56 37.0	8.063					
15 47 39.51	2.7311	25 4 35.1	7.873					
15 50 23.52	2.7358	25 12 21.7	7.681					
15 53 7.81	2.7405	25 19 56.8	7.488					
15 55 52.38	2.7450	25 27 20.3	7.294					
15 58 37.21	2.7493	25 34 32.1	7.099					
16 1 22.29	2.7534	25 41 32.2	6.903					
16 4 7.62	2.7574	25 48 20.4	6.704					
16 6 53.18	2.7612	25 54 56.7	6.505					
16 9 38.96	2.7648	26 1 21.0	6.305					
16 12 24.96	2.7683	26 7 33.3	6.103					
16 15 11.16	2.7715	26 13 33.4	5.901					
16 17 57.54	2.7746	S. 26 19 21.4	5.698					

PHASES OF THE MOON.

☾	Last Quarter	. . . . .	Apr.	d h m	6 8 12.4
●	New Moon	. . . . .		13 23 35.7	
☾	First Quarter	. . . . .		22 3 39.1	
○	Full Moon	. . . . .		29 2 19.3	

☾	Perigee	. . . . .	Apr.	d h	1 11.6
☾	Apogee	. . . . .		17 3.6	
☾	Perigee	. . . . .		29 19.2	

AT GREENWICH APPARENT NOON.

Day of the Week.	Day of the Month.	THE SUN'S					Sidereal Time of Semidiameter Passing Meridian.	Equation of Time, to be Subtracted from Apparent Time.
		Apparent Right Ascension.	Diff. for 1 Hour.	Apparent Declination.	Diff. for 1 Hour.	Semidiameter.		
		h m s	s	° ' "	"	' "	s	m s
Sat.	1	2 30 28.34	9.522	N. 14 49 53.9	+45.86	15 54.12	65.97	2 51.04
SUN.	2	2 34 17.14	9.545	15 8 7.3	45.25	15 53.87	66.05	2 58.78
Mon.	3	2 38 6.50	9.568	15 26 5.8	44.62	15 53.63	66.13	3 5.96
Tues.	4	2 41 56.42	9.592	15 43 49.3	+43.98	15 53.39	66.21	3 12.58
Wed.	5	2 45 46.90	9.616	16 1 17.2	43.33	15 53.15	66.29	3 18.64
Thur.	6	2 49 37.97	9.640	16 18 29.2	42.67	15 52.91	66.37	3 24.11
Fri.	7	2 53 29.62	9.664	16 35 25.2	+41.99	15 52.68	66.45	3 29.00
Sat.	8	2 57 21.85	9.689	16 52 4.7	41.30	15 52.46	66.53	3 33.32
SUN.	9	3 1 14.67	9.713	17 8 27.5	40.59	15 52.24	66.61	3 37.04
Mon.	10	3 5 8.08	9.738	17 24 33.1	+39.87	15 52.02	66.70	3 40.18
Tues.	11	3 9 2.08	9.762	17 40 21.3	39.14	15 51.80	66.78	3 42.73
Wed.	12	3 12 56.66	9.786	17 55 51.8	38.40	15 51.58	66.86	3 44.70
Thur.	13	3 16 51.82	9.810	18 11 4.3	+37.64	15 51.37	66.94	3 46.09
Fri.	14	3 20 47.56	9.834	18 25 58.4	36.87	15 51.16	67.02	3 46.90
Sat.	15	3 24 43.88	9.858	18 40 33.9	36.09	15 50.95	67.10	3 47.15
SUN.	16	3 28 40.76	9.882	18 54 50.5	+35.29	15 50.75	67.18	3 46.82
Mon.	17	3 32 38.21	9.905	19 8 47.9	34.48	15 50.56	67.27	3 45.93
Tues.	18	3 36 36.22	9.928	19 22 25.8	33.67	15 50.37	67.35	3 44.48
Wed.	19	3 40 34.77	9.951	19 35 43.9	+32.84	15 50.19	67.43	3 42.49
Thur.	20	3 44 33.86	9.973	19 48 42.0	32.00	15 50.01	67.51	3 39.96
Fri.	21	3 48 33.49	9.995	20 1 19.8	31.15	15 49.83	67.59	3 36.90
Sat.	22	3 52 33.64	10.017	20 13 37.0	+30.29	15 49.66	67.66	3 33.32
SUN.	23	3 56 34.30	10.038	20 25 33.5	29.42	15 49.49	67.74	3 29.22
Mon.	24	4 0 35.48	10.059	20 37 9.0	28.54	15 49.32	67.81	3 24.62
Tues.	25	4 4 37.14	10.080	20 48 23.2	+27.65	15 49.15	67.89	3 19.53
Wed.	26	4 8 39.30	10.100	20 59 16.0	26.75	15 48.99	67.96	3 13.94
Thur.	27	4 12 41.94	10.120	21 9 47.2	25.84	15 48.83	68.03	3 7.87
Fri.	28	4 16 45.06	10.140	21 19 56.4	+24.92	15 48.67	68.10	3 1.33
Sat.	29	4 20 48.65	10.159	21 29 43.6	24.00	15 48.52	68.16	2 54.32
SUN.	30	4 24 52.70	10.178	21 39 8.6	23.07	15 48.37	68.22	2 46.85
Mon.	31	4 28 57.20	10.197	21 48 11.1	22.13	15 48.22	68.28	2 38.93
Tues.	32	4 33 2.15	10.215	N. 21 56 51.0	+21.18	15 48.07	68.33	2 30.56

NOTE.—The mean time of semidiameter passing the meridian may be found by subtracting 0°.18 from the time.

The sign + prefixed to the hourly change of declination indicates that north declinations are increasing.

AT GREENWICH MEAN NOON.

Day of the Month.	THE SUN'S				Equation of Time, to be Added to Mean Time.	Diff. for 1 Hour.	Sidereal Time, or Right Ascension of Mean Sun.
	Apparent Right Ascension.	Diff. for 1 Hour.	Apparent Declination.	Diff. for 1 Hour.			
	h m s	s	° ' "	"	m s	s	h m s
1	2 30 28.80	9.523	N. 14 49 56.1	+45.87	2 51.06	0.333	2 33 19.86
2	2 34 17.62	9.546	15 8 9.6	45.26	2 58.80	0.311	2 37 16.42
3	2 38 6.99	9.569	15 26 8.2	44.63	3 5.98	0.288	2 41 12.97
4	2 41 56.93	9.592	15 43 51.6	+43.99	3 12.60	0.264	2 45 9.53
5	2 45 47.43	9.616	16 1 19.6	43.33	3 18.65	0.240	2 49 6.08
6	2 49 38.51	9.640	16 18 31.7	42.66	3 24.12	0.216	2 53 2.64
7	2 53 30.18	9.665	16 35 27.6	+41.99	3 29.02	0.192	2 56 59.19
8	2 57 22.42	9.689	16 52 7.2	41.30	3 33.32	0.167	3 0 55.75
9	3 1 15.26	9.714	17 8 29.9	40.59	3 37.05	0.143	3 4 52.31
10	3 5 8.68	9.738	17 24 35.6	+39.87	3 40.18	0.118	3 8 48.86
11	3 9 2.68	9.762	17 40 23.7	39.14	3 42.74	0.094	3 12 45.42
12	3 12 57.27	9.787	17 55 54.2	38.40	3 44.71	0.070	3 16 41.98
13	3 16 52.44	9.811	18 11 6.7	+37.64	3 46.10	0.046	3 20 38.53
14	3 20 48.18	9.835	18 26 0.8	36.87	3 46.91	0.022	3 24 35.09
15	3 24 44.50	9.858	18 40 36.2	36.08	3 47.14	0.001	3 28 31.65
16	3 28 41.39	9.882	18 54 52.8	+35.28	3 46.82	0.025	3 32 28.20
17	3 32 38.84	9.905	19 8 50.1	34.47	3 45.92	0.049	3 36 24.76
18	3 36 36.84	9.928	19 22 27.9	33.65	3 44.48	0.072	3 40 21.32
19	3 40 35.39	9.951	19 35 45.9	+32.83	3 42.49	0.094	3 44 17.87
20	3 44 34.47	9.973	19 48 43.9	31.99	3 39.96	0.116	3 48 14.43
21	3 48 34.10	9.995	20 1 21.7	31.14	3 36.89	0.138	3 52 10.99
22	3 52 34.23	10.016	20 13 38.8	+30.28	3 33.31	0.160	3 56 7.54
23	3 56 34.89	10.038	20 25 35.2	29.41	3 29.21	0.181	4 0 4.10
24	4 0 36.05	10.059	20 37 10.6	28.53	3 24.61	0.202	4 4 0.66
25	4 4 37.70	10.079	20 48 24.7	+27.64	3 19.52	0.223	4 7 57.22
26	4 8 39.84	10.099	20 59 17.5	26.74	3 13.93	0.243	4 11 53.78
27	4 12 42.47	10.119	21 9 48.5	25.84	3 7.86	0.263	4 15 50.33
28	4 16 45.57	10.139	21 19 57.7	+24.93	3 1.32	0.282	4 19 46.89
29	4 20 49.14	10.158	21 29 44.8	24.01	2 54.31	0.302	4 23 43.45
30	4 24 53.17	10.177	21 39 9.7	23.07	2 46.84	0.321	4 27 40.01
31	4 28 57.65	10.196	21 48 12.1	22.13	2 38.91	0.339	4 31 36.56
32	4 33 2.58	10.214	N. 21 56 51.9	+21.18	2 30.54	0.357	4 35 33.12

—The semidiameter for mean noon may be assumed the same as that for apparent noon.
 The sign + prefixed to the hourly change of declination indicates that north declinations are increasing.

Diff. for 1 Hour,
 +9^m.8565.
 (Table III.)

AT GREENWICH MEAN NOON.

Day of the Month.	Day of the Year.	THE SUN'S				Logarithm of the Radius Vector of the Earth.	Diff. for 1 Hour.	Mean Time of Sidereal Noon.
		True Longitude.		Diff. for 1 Hour.	Latitude.			
		λ	λ'					
1	121	40 2 15.8	1 50.1	145.50	-0.38	0.003 3479	+46.1	h m s 21 23 9.35
2	122	41 0 27.1	0 1.3	145.44	0.34	0.003 4584	45.9	21 19 13.44
3	123	41 58 36.8	58 10.9	145.38	0.27	0.003 5682	45.6	21 15 17.53
4	124	42 56 45.1	56 19.0	145.32	-0.17	0.003 6774	+45.3	21 11 21.62
5	125	43 54 52.0	54 25.8	145.26	-0.05	0.003 7858	44.9	21 7 25.71
6	126	44 52 57.4	52 31.1	145.20	+0.08	0.003 8930	44.4	21 3 29.80
7	127	45 51 1.6	50 35.1	145.14	+0.20	0.003 9990	+43.9	20 59 33.89
8	128	46 49 4.4	48 37.7	145.09	0.33	0.004 1037	43.3	20 55 37.98
9	129	47 47 5.7	46 38.9	145.03	0.45	0.004 2069	42.6	20 51 42.07
10	130	48 45 5.7	44 38.7	144.97	+0.54	0.004 3084	+41.9	20 47 46.16
11	131	49 43 4.3	42 37.1	144.91	0.62	0.004 4083	41.2	20 43 50.25
12	132	50 41 1.4	40 34.0	144.85	0.68	0.004 5063	40.5	20 39 54.34
13	133	51 38 57.0	38 29.6	144.79	+0.72	0.004 6025	+39.7	20 35 58.43
14	134	52 36 51.2	36 23.6	144.72	0.72	0.004 6969	38.9	20 32 2.52
15	135	53 34 43.8	34 16.0	144.66	0.70	0.004 7892	38.1	20 28 6.61
16	136	54 32 35.0	32 7.0	144.59	+0.66	0.004 8797	+37.3	20 24 10.70
17	137	55 30 24.6	29 56.4	144.53	0.60	0.004 9683	36.5	20 20 14.79
18	138	56 28 12.6	27 44.3	144.47	0.51	0.005 0550	35.7	20 16 18.88
19	139	57 25 59.0	25 30.5	144.40	+0.39	0.005 1398	+34.9	20 12 22.96
20	140	58 23 43.8	23 15.2	144.33	0.27	0.005 2227	34.2	20 8 27.05
21	141	59 21 27.0	20 58.2	144.27	0.14	0.005 3040	33.5	20 4 31.14
22	142	60 19 8.5	18 39.6	144.20	+0.01	0.005 3836	+32.8	20 0 35.23
23	143	61 16 48.5	16 19.4	144.13	-0.11	0.005 4616	32.2	19 56 39.32
24	144	62 14 26.9	13 57.6	144.07	0.23	0.005 5383	31.7	19 52 43.41
25	145	63 12 3.8	11 34.3	144.01	-0.31	0.005 6136	+31.2	19 48 47.50
26	146	64 9 39.2	9 9.6	143.95	0.36	0.005 6878	30.7	19 44 51.58
27	147	65 7 13.3	6 43.5	143.89	0.38	0.005 7608	30.2	19 40 55.67
28	148	66 4 46.1	4 16.1	143.84	-0.37	0.005 8328	+29.8	19 36 59.76
29	149	67 2 17.7	1 47.5	143.79	0.33	0.005 9038	29.4	19 33 3.85
30	150	67 59 48.2	59 17.9	143.75	0.27	0.005 9738	28.9	19 29 7.94
31	151	68 57 17.8	56 47.3	143.72	0.17	0.006 0427	28.4	19 25 12.02
32	152	69 54 46.5	54 15.8	143.68	-0.05	0.006 1103	+27.9	19 21 16.11

NOTE.—The longitudes in the column λ are referred to the true equinox of their own date, while those in the column λ' are referred to the mean equinox of the beginning of the Besselian fictitious year.

Diff. for 1 Hour,
—9^s.8296.
(Table II.)

GREENWICH MEAN TIME.

Day of the Month.	THE MOON'S								
	SEMIDIAMETER.		HORIZONTAL PARALLAX.				UPPER TRANSIT.		AGE.
	Noon.	Midnight.	Noon.	Diff. for 1 Hour.	Midnight.	Diff. for 1 Hour.	Meridian of Greenwich.	Diff. for 1 Hour.	Noon.
	' "	' "	' "	"	' "	"	h m	m	d
1	16 39.9	16 36.3	61 3.74	-0.933	60 50.50	-1.266	14 22.4	2.75	17.0
2	16 31.6	16 26.2	60 33.53	1.554	60 13.41	1.789	15 27.9	2.68	18.0
3	16 20.0	16 13.4	59 50.79	1.969	59 26.35	2.094	16 30.2	2.50	19.0
4	16 6.4	15 59.2	59 0.73	-2.167	58 34.53	-2.192	17 27.4	2.27	20.0
5	15 52.1	15 45.0	58 8.27	2.178	57 42.41	2.127	18 19.1	2.05	21.0
6	15 38.2	15 31.6	57 17.33	2.049	56 53.33	1.948	19 6.2	1.88	22.0
7	15 25.5	15 19.7	56 30.64	-1.831	56 9.42	-1.704	19 49.8	1.77	23.0
8	15 14.3	15 9.4	55 49.77	1.570	55 31.75	1.432	20 31.5	1.71	24.0
9	15 5.0	15 1.0	55 15.40	1.293	55 0.71	1.157	21 12.3	1.70	25.0
10	14 57.4	14 54.3	54 47.63	-1.025	54 36.11	-0.896	21 53.5	1.74	26.0
11	14 51.5	14 49.2	54 26.11	0.771	54 17.59	0.651	22 35.9	1.80	27.0
12	14 47.3	14 45.7	54 10.48	0.535	54 4.74	0.422	23 20.4	1.90	28.0
13	14 44.5	14 43.7	54 0.34	-0.311	53 57.28	-0.199	6	.	29.0
14	14 43.2	14 43.1	53 55.56	-0.088	53 55.18	+0.026	0 7.2	2.00	0.4
15	14 43.4	14 44.0	53 56.18	+0.142	53 58.60	0.263	0 56.3	2.09	1.4
16	14 45.1	14 46.6	54 2.53	+0.393	54 8.04	+0.527	1 47.1	2.13	2.4
17	14 48.6	14 51.0	54 15.19	0.665	54 24.04	0.811	2 38.4	2.13	3.4
18	14 53.9	14 57.3	54 34.69	0.966	54 47.23	1.126	3 29.2	2.09	4.4
19	15 1.2	15 5.7	55 1.71	+1.289	55 18.16	+1.453	4 18.6	2.02	5.4
20	15 10.7	15 16.3	55 36.57	1.615	55 56.92	1.775	5 6.2	1.95	6.4
21	15 22.3	15 28.9	56 19.13	1.925	56 43.07	2.062	5 52.3	1.90	7.4
22	15 35.8	15 43.1	57 8.54	+2.179	57 35.26	+2.270	6 37.6	1.88	8.4
23	15 50.6	15 58.3	58 2.89	2.329	58 31.01	2.350	7 23.2	1.92	9.4
24	16 5.9	16 13.4	58 59.09	2.322	59 26.54	2.244	8 10.3	2.02	10.4
25	16 20.5	16 27.1	59 52.71	+2.109	60 16.91	+1.915	9 0.5	2.18	11.4
26	16 33.0	16 37.9	60 38.43	1.663	60 56.59	1.355	9 55.1	2.38	12.4
27	16 41.8	16 44.4	61 10.75	0.998	61 20.40	+0.605	10 55.0	2.61	13.4
28	16 45.7	16 45.6	61 25.18	+0.189	61 24.89	-0.237	11 59.8	2.77	14.4
29	16 44.2	16 41.4	61 19.52	-0.656	61 9.25	1.051	13 7.1	2.80	15.4
30	16 37.4	16 32.2	60 54.44	1.410	60 35.61	1.720	14 13.2	2.68	16.4
31	16 26.2	16 19.4	60 13.38	1.975	59 48.44	2.171	15 14.9	2.45	17.4
32	16 12.0	16 4.3	59 21.51	-2.307	58 53.30	-2.385	16 10.8	2.21	18.4

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	
SATURDAY 1.					MONDAY 3.				
0	h m s	s	° ' "	"	0	h m s	s	° ' "	
0	16 17 57.54	2.7746	S. 26 19 21.4	5.698	0	18 30 48.51	2.6833	S. 26 53 23.1	
1	16 20 44.11	2.7776	26 24 57.1	5.493	1	18 33 29.31	2.6768	26 49 10.0	
2	16 23 30.85	2.7803	26 30 20.5	5.288	2	18 36 9.72	2.6702	26 44 45.9	
3	16 26 17.74	2.7827	26 35 31.6	5.082	3	18 38 49.73	2.6634	26 40 10.8	
4	16 29 4.77	2.7850	26 40 30.3	4.875	4	18 41 29.33	2.6566	26 35 24.9	
5	16 31 51.94	2.7872	26 45 16.6	4.668	5	18 44 8.52	2.6497	26 30 28.2	
6	16 34 39.23	2.7891	26 49 50.5	4.460	6	18 46 47.29	2.6425	26 25 20.8	
7	16 37 26.63	2.7908	26 54 11.8	4.251	7	18 49 25.62	2.6353	26 20 2.9	
8	16 40 14.12	2.7923	26 58 20.6	4.043	8	18 52 3.52	2.6280	26 14 34.5	
9	16 43 1.70	2.7936	27 2 16.9	3.833	9	18 54 40.98	2.6206	26 8 55.7	
10	16 45 49.35	2.7947	27 6 0.6	3.623	10	18 57 17.99	2.6131	26 3 6.7	
11	16 48 37.06	2.7955	27 9 31.6	3.412	11	18 59 54.55	2.6054	25 57 7.5	
12	16 51 24.81	2.7962	27 12 50.0	3.201	12	19 2 30.64	2.5977	25 50 58.3	
13	16 54 12.60	2.7967	27 15 55.7	2.990	13	19 5 6.27	2.5898	25 44 39.1	
14	16 57 0.41	2.7969	27 18 48.8	2.779	14	19 7 41.42	2.5819	25 38 10.1	
15	16 59 48.23	2.7969	27 21 29.2	2.568	15	19 10 16.10	2.5739	25 31 31.4	
16	17 2 36.04	2.7968	27 23 56.9	2.356	16	19 12 50.29	2.5658	25 24 43.0	
17	17 5 23.84	2.7963	27 26 11.9	2.144	17	19 15 24.00	2.5578	25 17 45.1	
18	17 8 11.60	2.7957	27 28 14.2	1.933	18	19 17 57.22	2.5496	25 10 37.8	
19	17 10 59.32	2.7948	27 30 3.9	1.723	19	19 20 29.95	2.5413	25 3 21.2	
20	17 13 46.98	2.7938	27 31 40.9	1.511	20	19 23 2.18	2.5330	24 55 55.4	
21	17 16 34.57	2.7925	27 33 5.2	1.300	21	19 25 33.91	2.5246	24 48 20.6	
22	17 19 22.08	2.7911	27 34 16.9	1.090	22	19 28 5.13	2.5162	24 40 36.8	
23	17 22 9.50	2.7894	S. 27 35 16.0	0.879	23	19 30 35.85	2.5078	S. 24 32 44.1	
SUNDAY 2.					TUESDAY 4.				
0	h m s	s	° ' "	"	0	h m s	s	° ' "	
0	17 24 56.81	2.7875	S. 27 36 2.4	0.668	0	19 33 6.06	2.4993	S. 24 24 42.7	
1	17 27 44.00	2.7854	27 36 36.2	0.459	1	19 35 35.76	2.4907	24 16 32.7	
2	17 30 31.06	2.7831	27 36 57.5	0.251	2	19 38 4.94	2.4820	24 8 14.2	
3	17 33 17.97	2.7805	27 37 6.3	0.042	3	19 40 33.60	2.4734	23 59 47.3	
4	17 36 4.72	2.7778	27 37 2.5	+0.167	4	19 43 1.75	2.4648	23 51 12.1	
5	17 38 51.30	2.7748	27 36 46.3	0.373	5	19 45 29.38	2.4562	23 42 28.7	
6	17 41 37.70	2.7717	27 36 17.7	0.579	6	19 47 56.49	2.4475	23 33 37.3	
7	17 44 23.90	2.7683	27 35 36.8	0.785	7	19 50 23.08	2.4388	23 24 38.0	
8	17 47 9.89	2.7648	27 34 43.5	0.990	8	19 52 49.14	2.4301	23 15 30.8	
9	17 49 55.67	2.7611	27 33 38.0	1.194	9	19 55 14.69	2.4214	23 6 15.9	
10	17 52 41.22	2.7571	27 32 20.2	1.398	10	19 57 39.71	2.4127	22 56 53.4	
11	17 55 26.52	2.7529	27 30 50.2	1.601	11	20 0 4.21	2.4039	22 47 23.4	
12	17 58 11.57	2.7486	27 29 8.1	1.802	12	20 2 28.18	2.3952	22 37 46.0	
13	18 0 56.35	2.7441	27 27 14.0	2.003	13	20 4 51.63	2.3865	22 28 1.4	
14	18 3 40.86	2.7394	27 25 7.9	2.202	14	20 7 14.56	2.3778	22 18 9.6	
15	18 6 25.08	2.7346	27 22 49.8	2.400	15	20 9 36.97	2.3692	22 8 10.8	
16	18 9 9.01	2.7296	27 20 10.9	2.597	16	20 11 58.86	2.3605	21 58 5.1	
17	18 11 52.63	2.7243	27 17 38.2	2.793	17	20 14 20.23	2.3519	21 47 52.6	
18	18 14 35.93	2.7189	27 14 44.8	2.987	18	20 16 41.09	2.3433	21 37 33.4	
19	18 17 18.90	2.7133	27 11 30.8	3.179	19	20 19 1.42	2.3346	21 27 7.5	
20	18 20 1.53	2.7077	27 8 23.3	3.371	20	20 21 21.24	2.3261	21 16 35.2	
21	18 22 43.82	2.7018	27 4 55.3	3.563	21	20 23 40.55	2.3175	21 5 56.5	
22	18 25 25.75	2.6958	27 1 15.8	3.752	22	20 25 59.34	2.3090	20 55 11.5	
23	18 28 7.32	2.6897	26 57 25.1	3.939	23	20 28 17.63	2.3006	20 44 20.4	
24	18 30 48.51	2.6833	S. 26 53 23.1	4.126	24	20 30 35.41	2.2921	S. 20 33 23.2	

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
WEDNESDAY 5.					FRIDAY 7.				
0	h m s	s	° ' "	"	0	h m s	s	° ' "	"
0	20 30 35.41	2.2921	S. 20 33 23.2	11.003	0	22 12 1.33	1.9628	S. 10 20 41.7	13.972
1	20 32 52.68	2.2837	20 22 20.1	11.101	1	22 13 58.95	1.9578	10 6 42.5	14.002
2	20 35 9.45	2.2753	20 11 11.1	11.198	2	22 15 56.27	1.9530	9 52 41.5	14.031
3	20 37 25.72	2.2670	19 59 56.4	11.292	3	22 17 53.31	1.9483	9 38 38.8	14.058
4	20 39 41.49	2.2588	19 48 36.1	11.385	4	22 19 50.06	1.9436	9 24 34.6	14.083
5	20 41 56.77	2.2505	19 37 10.2	11.477	5	22 21 46.54	1.9391	9 10 28.8	14.108
6	20 44 11.55	2.2423	19 25 38.9	11.566	6	22 23 42.75	1.9346	8 56 21.6	14.132
7	20 46 25.85	2.2343	19 14 2.3	11.653	7	22 25 38.69	1.9302	8 42 13.0	14.155
8	20 48 39.66	2.2262	19 2 20.5	11.740	8	22 27 34.37	1.9259	8 28 3.0	14.177
9	20 50 52.99	2.2182	18 50 33.5	11.825	9	22 29 29.80	1.9217	8 13 51.8	14.198
10	20 53 5.84	2.2103	18 38 41.5	11.908	10	22 31 24.97	1.9175	7 59 39.3	14.218
11	20 55 18.22	2.2024	18 26 44.6	11.988	11	22 33 19.90	1.9135	7 45 25.7	14.236
12	20 57 30.13	2.1946	18 14 42.9	12.068	12	22 35 14.59	1.9095	7 31 11.0	14.253
13	20 59 41.57	2.1868	18 2 36.4	12.147	13	22 37 9.04	1.9057	7 16 55.3	14.270
14	21 1 52.55	2.1791	17 50 25.3	12.223	14	22 39 3.27	1.9020	7 2 38.6	14.286
15	21 4 3.06	2.1714	17 38 9.6	12.298	15	22 40 57.28	1.8983	6 48 21.0	14.301
16	21 6 13.12	2.1639	17 25 49.5	12.371	16	22 42 51.06	1.8946	6 34 2.5	14.314
17	21 8 22.73	2.1564	17 13 25.1	12.443	17	22 44 44.63	1.8911	6 19 43.3	14.327
18	21 10 31.89	2.1490	17 0 56.4	12.513	18	22 46 37.99	1.8876	6 5 23.3	14.338
19	21 12 40.61	2.1417	16 48 23.5	12.582	19	22 48 31.14	1.8843	5 51 2.7	14.349
20	21 14 48.89	2.1343	16 35 46.6	12.648	20	22 50 24.10	1.8810	5 36 41.4	14.359
21	21 16 56.73	2.1271	16 23 5.7	12.714	21	22 52 16.86	1.8775	5 22 19.6	14.368
22	21 19 4.14	2.1200	16 10 20.9	12.778	22	22 54 9.43	1.8747	5 7 57.2	14.377
23	21 21 11.13	2.1129	S. 15 57 32.3	12.842	23	22 56 1.82	1.8717	S. 4 53 34.4	14.383
THURSDAY 6.					SATURDAY 8.				
0	21 23 17.69	2.1059	S. 15 44 39.9	12.903	0	22 57 54.93	1.8688	S. 4 39 11.2	14.389
1	21 25 23.84	2.0991	15 31 44.0	12.962	1	22 59 46.07	1.8659	4 24 47.7	14.395
2	21 27 29.58	2.0923	15 18 44.5	13.021	2	23 1 37.94	1.8631	4 10 23.8	14.400
3	21 29 34.91	2.0854	15 5 41.5	13.078	3	23 3 29.64	1.8604	3 55 59.7	14.403
4	21 31 39.83	2.0788	14 52 35.2	13.133	4	23 5 21.19	1.8578	3 41 35.4	14.406
5	21 33 44.36	2.0722	14 39 25.6	13.188	5	23 7 12.58	1.8553	3 27 11.0	14.408
6	21 35 48.49	2.0657	14 26 12.7	13.241	6	23 9 3.82	1.8528	3 12 46.5	14.408
7	21 37 52.24	2.0593	14 12 56.7	13.292	7	23 10 54.92	1.8505	2 58 22.0	14.408
8	21 39 55.60	2.0528	13 59 37.7	13.342	8	23 12 45.88	1.8483	2 43 57.5	14.408
9	21 41 58.58	2.0466	13 46 15.7	13.391	9	23 14 36.71	1.8461	2 29 33.1	14.406
10	21 44 1.19	2.0404	13 32 50.8	13.438	10	23 16 27.41	1.8439	2 15 8.8	14.403
11	21 46 3.43	2.0343	13 19 23.1	13.484	11	23 18 17.98	1.8419	2 0 44.7	14.400
12	21 48 5.31	2.0283	13 5 52.7	13.528	12	23 20 8.44	1.8400	1 46 20.8	14.396
13	21 50 6.83	2.0224	12 52 19.7	13.573	13	23 21 58.78	1.8381	1 31 57.2	14.390
14	21 52 8.00	2.0166	12 38 44.0	13.615	14	23 23 49.01	1.8363	1 17 34.0	14.384
15	21 54 8.82	2.0108	12 25 5.9	13.656	15	23 25 39.13	1.8345	1 3 11.1	14.378
16	21 56 9.29	2.0051	12 11 25.3	13.697	16	23 27 29.15	1.8329	0 48 48.6	14.371
17	21 58 9.43	1.9995	11 57 42.3	13.735	17	23 29 19.08	1.8314	0 34 26.6	14.363
18	22 0 9.23	1.9939	11 43 57.1	13.772	18	23 31 8.92	1.8299	0 20 5.1	14.353
19	22 2 8.70	1.9885	11 30 9.7	13.808	19	23 32 58.67	1.8285	S. 0 5 44.2	14.343
20	22 4 7.85	1.9833	11 16 20.1	13.844	20	23 34 48.34	1.8272	N. 0 8 36.0	14.332
21	22 6 6.69	1.9780	11 2 28.4	13.878	21	23 36 37.93	1.8258	0 22 55.6	14.321
22	22 8 5.21	1.9728	10 48 34.7	13.911	22	23 38 27.44	1.8247	0 37 14.5	14.308
23	22 10 3.42	1.9677	10 34 39.1	13.942	23	23 40 16.89	1.8237	0 51 32.6	14.295
24	22 12 1.33	1.9628	S. 10 20 41.7	13.972	24	23 42 6.28	1.8227	N. 1 5 49.9	14.281

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
SUNDAY 9.					TUESDAY 11.				
0	h m s	s	" "	" "	0	h m s	s	" "	" "
0	23 42 6.28	1.8227	N. 1 5 49.9	14.281	0	1 9 46.85	1.8559	N. 12 0 30.5	12.701
1	23 43 55.61	1.8217	1 20 6.3	14.266	1	1 11 38.27	1.8581	12 13 11.2	12.652
2	23 45 44.88	1.8208	1 34 21.8	14.250	2	1 13 29.82	1.8603	12 25 48.7	12.598
3	23 47 34.11	1.8201	1 48 36.3	14.234	3	1 15 21.51	1.8628	12 38 23.0	12.548
4	23 49 23.29	1.8193	2 2 49.9	14.218	4	1 17 13.35	1.8651	12 50 54.1	12.492
5	23 51 12.43	1.8188	2 17 2.4	14.199	5	1 19 5.32	1.8674	13 3 22.0	12.437
6	23 53 1.54	1.8182	2 31 13.8	14.180	6	1 20 57.44	1.8700	13 15 46.5	12.380
7	23 54 50.61	1.8177	2 45 24.0	14.161	7	1 22 49.72	1.8726	13 28 7.6	12.322
8	23 56 39.66	1.8173	2 59 33.1	14.142	8	1 24 42.15	1.8751	13 40 25.4	12.268
9	23 58 28.68	1.8169	3 13 41.0	14.120	9	1 26 34.73	1.8777	13 52 39.7	12.209
10	0 0 17.69	1.8167	3 27 47.5	14.098	10	1 28 27.47	1.8803	14 4 50.5	12.150
11	0 2 6.68	1.8164	3 41 52.7	14.075	11	1 30 20.37	1.8831	14 16 57.7	12.091
12	0 3 55.66	1.8163	3 55 56.5	14.052	12	1 32 13.44	1.8859	14 29 1.4	12.031
13	0 5 44.64	1.8163	4 9 58.9	14.028	13	1 34 6.68	1.8887	14 41 1.4	11.969
14	0 7 33.61	1.8163	4 23 59.9	14.003	14	1 36 0.08	1.8915	14 52 57.7	11.907
15	0 9 22.59	1.8163	4 37 59.3	13.978	15	1 37 53.66	1.8944	15 4 50.2	11.844
16	0 11 11.57	1.8165	4 51 57.2	13.951	16	1 39 47.41	1.8973	15 16 39.0	11.780
17	0 13 0.57	1.8168	5 5 53.4	13.923	17	1 41 41.34	1.9003	15 28 24.0	11.717
18	0 14 49.58	1.8170	5 19 48.0	13.896	18	1 43 35.45	1.9033	15 40 5.0	11.651
19	0 16 38.61	1.8173	5 33 40.9	13.868	19	1 45 29.74	1.9064	15 51 42.1	11.585
20	0 18 27.66	1.8178	5 47 32.1	13.838	20	1 47 24.22	1.9096	16 3 15.2	11.518
21	0 20 16.75	1.8183	6 1 21.5	13.808	21	1 49 18.89	1.9127	16 14 44.3	11.451
22	0 22 5.86	1.8190	6 15 9.0	13.777	22	1 51 13.74	1.9158	16 26 9.3	11.383
23	0 23 55.01	1.8196	N. 6 28 54.7	13.745	23	1 53 8.79	1.9191	N. 16 37 30.2	11.313
MONDAY 10.					WEDNESDAY 12.				
0	0 25 44.21	1.8203	N. 6 42 38.4	13.712	0	1 55 4.03	1.9223	N. 16 48 46.8	11.242
1	0 27 33.45	1.8210	6 56 20.1	13.678	1	1 56 59.47	1.9256	16 59 59.2	11.172
2	0 29 22.73	1.8218	7 9 59.8	13.645	2	1 58 55.10	1.9289	17 11 7.4	11.100
3	0 31 12.07	1.8228	7 23 37.5	13.611	3	2 0 50.94	1.9323	17 22 11.2	11.028
4	0 33 1.46	1.8237	7 37 13.1	13.575	4	2 2 46.98	1.9357	17 33 10.7	10.955
5	0 34 50.91	1.8248	7 50 46.5	13.538	5	2 4 43.22	1.9391	17 44 5.8	10.881
6	0 36 40.43	1.8258	8 4 17.7	13.501	6	2 6 39.67	1.9426	17 54 56.4	10.805
7	0 38 30.01	1.8270	8 17 46.6	13.463	7	2 8 36.33	1.9461	18 5 42.4	10.729
8	0 40 19.67	1.8283	8 31 13.2	13.424	8	2 10 33.20	1.9497	18 16 23.9	10.653
9	0 42 9.40	1.8295	8 44 37.5	13.386	9	2 12 30.29	1.9533	18 27 0.7	10.575
10	0 43 59.21	1.8308	8 57 59.5	13.346	10	2 14 27.58	1.9567	18 37 32.9	10.498
11	0 45 49.10	1.8323	9 11 19.0	13.304	11	2 16 25.09	1.9603	18 48 0.4	10.418
12	0 47 39.08	1.8338	9 24 36.0	13.263	12	2 18 22.82	1.9640	18 58 23.1	10.338
13	0 49 29.15	1.8353	9 37 50.5	13.221	13	2 20 20.77	1.9676	19 8 41.0	10.258
14	0 51 19.31	1.8368	9 51 2.5	13.178	14	2 22 18.93	1.9712	19 18 54.0	10.175
15	0 53 9.57	1.8385	10 4 11.8	13.133	15	2 24 17.31	1.9749	19 29 2.0	10.093
16	0 54 59.93	1.8403	10 17 18.4	13.088	16	2 26 15.92	1.9787	19 39 5.1	10.010
17	0 56 50.40	1.8420	10 30 22.4	13.043	17	2 28 14.75	1.9823	19 49 3.2	9.926
18	0 58 40.97	1.8438	10 43 23.6	12.997	18	2 30 13.80	1.9861	19 58 56.2	9.841
19	1 0 31.65	1.8457	10 56 22.0	12.950	19	2 32 13.08	1.9898	20 8 44.1	9.756
20	1 2 22.45	1.8477	11 9 17.6	12.903	20	2 34 12.58	1.9936	20 18 26.9	9.669
21	1 4 13.37	1.8496	11 22 10.3	12.853	21	2 36 12.31	1.9974	20 28 4.4	9.582
22	1 6 4.40	1.8516	11 35 0.0	12.804	22	2 38 12.27	2.0013	20 37 36.7	9.493
23	1 7 55.56	1.8538	11 47 46.8	12.754	23	2 40 12.46	2.0051	20 47 3.6	9.404
24	1 9 46.85	1.8559	N. 12 0 30.5	12.703	24	2 42 12.88	2.0089	N. 20 56 25.2	9.315

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
THURSDAY 13.				SATURDAY 15.				
h m s	s	° ' "	"	0	h m s	s	° ' "	"
2 42 12.88	2.0089	N. 20 56 25.2	9.315	1	4 22 55.83	2.1785	N. 26 25 21.8	4.117
2 44 13.53	2.0127	21 5 41.4	9.324	2	4 25 6.62	2.1812	26 29 25.1	3.993
2 46 14.40	2.0165	21 14 52.1	9.133	3	4 27 17.57	2.1838	26 33 21.0	3.868
2 48 15.51	2.0204	21 23 57.3	9.041	4	4 29 28.68	2.1864	26 37 9.3	3.743
2 50 16.85	2.0243	21 32 57.0	8.948	5	4 31 39.94	2.1888	26 40 50.1	3.617
2 52 18.42	2.0281	21 41 51.0	8.853	6	4 33 51.34	2.1913	26 44 23.3	3.491
2 54 20.22	2.0320	21 50 39.4	8.759	7	4 36 2.89	2.1937	26 47 49.0	3.364
2 56 22.26	2.0359	21 59 22.1	8.663	8	4 38 14.58	2.1959	26 51 7.0	3.237
2 58 24.53	2.0398	22 7 59.0	8.567	9	4 40 26.40	2.1982	26 54 17.4	3.109
3 0 27.03	2.0436	22 16 30.1	8.470	10	4 42 38.36	2.2004	26 57 20.1	2.981
3 2 29.76	2.0474	22 24 55.4	8.373	11	4 44 50.45	2.2025	27 0 15.1	2.853
3 4 32.72	2.0513	22 33 14.8	8.274	12	4 47 2.66	2.2045	27 3 2.4	2.724
3 6 35.92	2.0553	22 41 28.3	8.175	13	4 49 14.99	2.2065	27 5 42.0	2.595
3 8 39.35	2.0591	22 49 35.8	8.074	14	4 51 27.44	2.2084	27 8 13.8	2.466
3 10 43.01	2.0628	22 57 37.2	7.973	15	4 53 40.00	2.2103	27 10 37.9	2.336
3 12 46.89	2.0667	23 5 32.6	7.872	16	4 55 52.67	2.2121	27 12 54.1	2.205
3 14 51.01	2.0706	23 13 21.8	7.769	17	4 58 5.45	2.2138	27 15 2.5	2.075
3 16 55.36	2.0744	23 21 4.9	7.666	18	5 0 18.32	2.2153	27 17 3.1	1.944
3 18 59.94	2.0782	23 28 41.7	7.562	19	5 2 31.29	2.2169	27 18 55.8	1.813
3 21 4.74	2.0819	23 36 12.3	7.458	20	5 4 44.35	2.2183	27 20 40.7	1.683
3 23 9.77	2.0857	23 43 36.6	7.352	21	5 6 57.49	2.2198	27 22 17.7	1.551
3 25 15.02	2.0894	23 50 54.5	7.245	22	5 9 10.72	2.2211	27 23 46.7	1.418
3 27 20.50	2.0932	23 58 6.0	7.138	23	5 11 24.02	2.2223	27 25 7.8	1.285
3 29 26.20	2.0968	N. 24 5 11.1	7.031	24	5 13 37.40	2.2236	N. 27 26 20.9	1.153
FRIDAY 14.				SUNDAY 16.				
3 31 32.12	2.1005	N. 24 12 9.7	6.923	0	5 15 50.85	2.2247	N. 27 27 26.1	1.021
3 33 38.26	2.1042	24 19 1.8	6.813	1	5 18 4.36	2.2258	27 28 23.4	0.888
3 35 44.62	2.1078	24 25 47.3	6.703	2	5 20 17.94	2.2268	27 29 12.6	0.754
3 37 51.20	2.1114	24 32 26.1	6.592	3	5 22 31.57	2.2276	27 29 53.9	0.621
3 39 57.99	2.1149	24 38 58.3	6.481	4	5 24 45.25	2.2283	27 30 27.1	0.488
3 42 4.99	2.1185	24 45 23.8	6.369	5	5 26 58.97	2.2291	27 30 52.4	0.355
3 44 12.21	2.1221	24 51 42.6	6.256	6	5 29 12.74	2.2298	27 31 9.7	0.221
3 46 19.64	2.1256	24 57 54.5	6.142	7	5 31 26.54	2.2303	27 31 18.9	0.087
3 48 27.28	2.1290	25 3 59.6	6.028	8	5 33 40.38	2.2308	27 31 20.1	-0.047
3 50 35.12	2.1323	25 9 57.9	5.914	9	5 35 54.24	2.2313	27 31 13.3	0.181
3 52 43.16	2.1358	25 15 49.3	5.798	10	5 38 8.13	2.2317	27 30 58.4	0.315
3 54 51.41	2.1392	25 21 33.7	5.682	11	5 40 22.04	2.2319	27 30 35.5	0.448
3 56 59.86	2.1424	25 27 11.1	5.565	12	5 42 35.96	2.2321	27 30 4.6	0.583
3 59 8.50	2.1457	25 32 41.5	5.448	13	5 44 49.89	2.2323	27 29 25.6	0.717
4 1 17.34	2.1489	25 38 4.9	5.330	14	5 47 3.83	2.2323	27 28 38.6	0.851
4 3 26.37	2.1521	25 43 21.1	5.211	15	5 49 17.77	2.2323	27 27 43.5	0.985
4 5 35.59	2.1553	25 48 30.2	5.092	16	5 51 31.70	2.2321	27 26 40.4	1.119
4 7 45.00	2.1583	25 53 32.1	4.972	17	5 53 45.62	2.2319	27 25 29.2	1.253
4 9 54.59	2.1613	25 58 26.8	4.852	18	5 55 59.53	2.2318	27 24 10.0	1.388
4 12 4.36	2.1643	26 3 14.3	4.731	19	5 58 13.43	2.2314	27 22 42.7	1.522
4 14 14.31	2.1673	26 7 54.5	4.609	20	6 0 27.30	2.2310	27 21 7.4	1.655
4 16 24.44	2.1703	26 12 27.4	4.487	21	6 2 41.15	2.2305	27 19 24.1	1.788
4 18 34.74	2.1730	26 16 52.9	4.364	22	6 4 54.96	2.2299	27 17 32.8	1.922
4 20 45.20	2.1758	26 21 11.1	4.241	23	6 7 8.74	2.2293	27 15 33.5	2.056
4 22 55.83	2.1785	N. 26 25 21.8	4.117	24	6 9 22.47	2.2285	N. 27 13 26.1	2.189

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.
MONDAY 17.					WEDNESDAY 19.			
0	h m s	s	° ' "	"	0	h m s	s	° ' "
0	6 9 22.47	2.2285	N. 27 13 26.1	2.189	0	7 54 24.85	2.1312	N. 23 0 19.7
1	6 11 36.16	2.2278	27 11 10.8	2.323	1	7 56 32.63	2.1283	22 52 4.9
2	6 13 49.81	2.2270	27 8 47.4	2.456	2	7 58 40.25	2.1256	22 43 43.3
3	6 16 3.40	2.2261	27 6 16.1	2.588	3	8 0 47.70	2.1228	22 35 15.0
4	6 18 16.94	2.2251	27 3 36.8	2.722	4	8 2 54.98	2.1199	22 26 40.0
5	6 20 30.41	2.2240	27 0 49.5	2.854	5	8 5 2.09	2.1171	22 17 58.4
6	6 22 43.82	2.2229	26 57 54.3	2.986	6	8 7 9.03	2.1143	22 9 10.3
7	6 24 57.16	2.2218	26 54 51.2	3.118	7	8 9 15.80	2.1114	22 0 15.6
8	6 27 10.43	2.2205	26 51 40.2	3.250	8	8 11 22.40	2.1085	21 51 14.4
9	6 29 23.62	2.2193	26 48 21.2	3.382	9	8 13 28.82	2.1057	21 42 6.7
10	6 31 36.74	2.2179	26 44 54.4	3.513	10	8 15 35.08	2.1029	21 32 52.6
11	6 33 49.77	2.2164	26 41 19.7	3.643	11	8 17 41.17	2.1001	21 23 32.1
12	6 36 2.71	2.2149	26 37 37.2	3.774	12	8 19 47.09	2.0973	21 14 5.3
13	6 38 15.56	2.2133	26 33 46.8	3.905	13	8 21 52.84	2.0945	21 4 32.2
14	6 40 28.31	2.2117	26 29 48.6	4.035	14	8 23 58.43	2.0917	20 54 52.8
15	6 42 40.96	2.2100	26 25 42.6	4.164	15	8 26 3.84	2.0888	20 45 7.1
16	6 44 53.51	2.2083	26 21 28.9	4.293	16	8 28 9.09	2.0861	20 35 15.3
17	6 47 5.95	2.2065	26 17 7.4	4.423	17	8 30 14.17	2.0833	20 25 17.4
18	6 49 18.29	2.2048	26 12 38.2	4.551	18	8 32 19.09	2.0807	20 15 13.3
19	6 51 30.52	2.2028	26 8 1.3	4.679	19	8 34 23.85	2.0779	20 5 3.2
20	6 53 42.63	2.2008	26 3 16.7	4.808	20	8 36 28.44	2.0752	19 54 47.1
21	6 55 54.62	2.1988	25 58 24.4	4.935	21	8 38 32.87	2.0725	19 44 25.0
22	6 58 6.49	2.1968	25 53 24.5	5.063	22	8 40 37.14	2.0698	19 33 57.0
23	7 0 18.24	2.1948	N. 25 48 16.9	5.189	23	8 42 41.25	2.0673	N. 19 23 23.1
TUESDAY 18.					THURSDAY 20.			
0	7 2 29.86	2.1926	N. 25 43 1.8	5.315	0	8 44 45.21	2.0647	N. 19 12 43.4
1	7 4 41.35	2.1904	25 37 39.1	5.441	1	8 46 49.01	2.0621	19 1 57.9
2	7 6 52.71	2.1882	25 32 8.9	5.566	2	8 48 52.66	2.0595	18 51 6.6
3	7 9 3.93	2.1859	25 26 31.2	5.691	3	8 50 56.15	2.0569	18 40 9.6
4	7 11 15.02	2.1837	25 20 46.0	5.815	4	8 52 59.49	2.0545	18 29 6.9
5	7 13 25.97	2.1813	25 14 53.4	5.939	5	8 55 2.60	2.0521	18 17 58.6
6	7 15 36.77	2.1788	25 8 53.3	6.063	6	8 57 5.74	2.0496	18 6 44.7
7	7 17 47.43	2.1764	25 2 45.9	6.185	7	8 59 8.64	2.0472	17 55 25.3
8	7 19 57.94	2.1740	24 56 31.1	6.308	8	9 1 11.40	2.0448	17 44 0.4
9	7 22 8.31	2.1715	24 50 9.0	6.429	9	9 3 14.02	2.0425	17 32 30.0
10	7 24 18.52	2.1689	24 43 39.6	6.551	10	9 5 16.50	2.0402	17 20 54.3
11	7 26 28.58	2.1664	24 37 2.9	6.673	11	9 7 18.84	2.0379	17 9 13.2
12	7 28 38.49	2.1638	24 30 18.9	6.793	12	9 9 21.05	2.0358	16 57 26.7
13	7 30 48.24	2.1613	24 23 27.8	6.912	13	9 11 23.13	2.0336	16 45 35.0
14	7 32 57.84	2.1586	24 16 29.5	7.032	14	9 13 25.08	2.0314	16 33 38.1
15	7 35 7.27	2.1559	24 9 24.0	7.151	15	9 15 26.90	2.0293	16 21 36.0
16	7 37 16.55	2.1533	24 2 11.4	7.268	16	9 17 28.60	2.0273	16 9 28.7
17	7 39 25.66	2.1505	23 54 51.8	7.385	17	9 19 30.18	2.0253	15 57 16.4
18	7 41 34.61	2.1478	23 47 25.2	7.502	18	9 21 31.64	2.0233	15 44 59.0
19	7 43 43.40	2.1451	23 39 51.6	7.618	19	9 23 32.98	2.0214	15 32 36.7
20	7 45 52.02	2.1423	23 32 11.0	7.734	20	9 25 34.21	2.0196	15 20 9.4
21	7 48 0.48	2.1396	23 24 23.5	7.849	21	9 27 35.33	2.0178	15 7 37.2
22	7 50 8.77	2.1368	23 16 29.1	7.964	22	9 29 36.34	2.0160	14 55 0.1
23	7 52 16.89	2.1340	23 8 27.8	8.078	23	9 31 37.25	2.0143	14 42 18.2
24	7 54 24.85	2.1312	N. 23 0 19.7	8.191	24	9 33 38.05	2.0126	N. 14 29 31.6

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
FRIDAY 21.					SUNDAY 23.				
0	h m s	s	° ' "	"	0	h m s	s	° ' "	"
1	9 33 38.05	2.0126	N. 14 29 31.6	12.817	1	11 9 31.45	2.0106	N. 2 59 7.8	15.604
2	9 35 38.76	2.0110	14 16 40.2	12.895	2	11 11 32.14	2.0125	2 43 30.5	15.639
3	9 37 39.37	2.0094	14 3 44.2	12.972	3	11 13 32.95	2.0144	2 27 51.1	15.673
4	9 39 39.89	2.0079	13 50 43.6	13.049	4	11 15 33.87	2.0164	2 12 9.8	15.704
5	9 41 40.32	2.0064	13 37 38.3	13.125	5	11 17 34.92	2.0186	1 56 26.6	15.736
6	9 43 40.66	2.0051	13 24 28.6	13.199	6	11 19 36.10	2.0208	1 40 41.5	15.767
7	9 45 40.93	2.0038	13 11 14.4	13.274	7	11 21 37.42	2.0232	1 24 54.6	15.795
8	9 47 41.12	2.0026	12 57 55.7	13.348	8	11 23 38.88	2.0256	1 9 6.1	15.823
9	9 49 41.24	2.0013	12 44 32.6	13.421	9	11 25 40.49	2.0280	0 53 15.9	15.850
10	9 51 41.28	2.0002	12 31 5.2	13.492	10	11 27 42.24	2.0305	0 37 24.1	15.875
11	9 53 41.26	1.9991	12 17 33.6	13.563	11	11 29 44.15	2.0333	0 21 30.9	15.898
12	9 55 41.17	1.9980	12 3 57.7	13.633	12	11 31 46.23	2.0361	N. 0 5 36.3	15.922
13	9 57 41.02	1.9971	11 50 17.6	13.703	13	11 33 48.48	2.0389	S. 0 10 19.7	15.944
14	9 59 40.82	1.9962	11 36 33.4	13.771	14	11 35 50.90	2.0418	0 26 17.0	15.964
15	10 1 40.56	1.9953	11 22 45.1	13.839	15	11 37 53.50	2.0448	0 12 15.4	15.983
16	10 3 40.26	1.9946	11 8 52.7	13.906	16	11 39 56.28	2.0479	0 58 15.0	16.002
17	10 5 39.91	1.9939	10 54 56.4	13.972	17	11 41 59.25	2.0512	1 14 15.7	16.019
18	10 7 39.53	1.9933	10 40 56.1	14.037	18	11 44 2.42	2.0545	1 30 17.3	16.034
19	10 9 39.11	1.9927	10 26 52.0	14.101	19	11 46 5.79	2.0578	1 46 19.8	16.048
20	10 11 38.65	1.9922	10 12 44.0	14.165	20	11 48 9.36	2.0613	2 2 23.1	16.061
21	10 13 38.17	1.9918	9 58 32.2	14.228	21	11 50 13.15	2.0650	2 18 27.1	16.073
22	10 15 37.67	1.9914	9 44 16.7	14.289	22	11 52 17.16	2.0687	2 34 31.8	16.083
23	10 17 37.14	1.9911	9 29 57.5	14.350	23	11 54 21.39	2.0724	2 50 37.0	16.092
24	10 19 36.60	1.9909	N. 9 15 34.7	14.410	24	11 56 25.85	2.0763	S. 3 6 42.8	16.099
SATURDAY 22.					MONDAY 24.				
0	10 21 36.05	1.9908	N. 9 1 8.3	14.469	0	11 58 30.55	2.0803	S. 3 22 48.9	16.104
1	10 23 35.49	1.9907	8 46 38.4	14.527	1	12 0 35.49	2.0843	3 38 55.3	16.109
2	10 25 34.93	1.9907	8 32 5.1	14.584	2	12 2 40.67	2.0884	3 55 2.0	16.113
3	10 27 34.37	1.9908	8 17 28.3	14.641	3	12 4 46.10	2.0927	4 11 8.8	16.114
4	10 29 33.82	1.9909	8 2 48.2	14.696	4	12 6 51.79	2.0971	4 27 15.7	16.115
5	10 31 33.28	1.9912	7 48 4.8	14.751	5	12 8 57.75	2.1016	4 43 22.6	16.113
6	10 33 32.76	1.9915	7 33 18.1	14.805	6	12 11 3.98	2.1061	4 59 29.3	16.110
7	10 35 32.26	1.9918	7 18 28.2	14.858	7	12 13 10.48	2.1107	5 15 35.8	16.106
8	10 37 31.78	1.9923	7 3 35.2	14.909	8	12 15 17.26	2.1154	5 31 42.0	16.100
9	10 39 31.33	1.9928	6 48 39.1	14.960	9	12 17 24.33	2.1203	5 47 47.8	16.093
10	10 41 30.92	1.9934	6 33 40.0	15.010	10	12 19 31.69	2.1252	6 3 53.1	16.083
11	10 43 30.54	1.9941	6 18 37.9	15.059	11	12 21 39.35	2.1303	6 19 57.8	16.073
12	10 45 30.21	1.9949	6 3 32.9	15.107	12	12 23 47.32	2.1353	6 36 1.9	16.061
13	10 47 29.93	1.9958	5 48 25.1	15.153	13	12 25 55.59	2.1405	6 52 5.1	16.047
14	10 49 29.70	1.9967	5 33 14.5	15.200	14	12 28 4.18	2.1458	7 8 7.5	16.032
15	10 51 29.53	1.9977	5 18 1.1	15.245	15	12 30 13.08	2.1511	7 24 8.9	16.014
16	10 53 29.42	1.9988	5 2 45.1	15.289	16	12 32 22.31	2.1566	7 40 9.2	15.996
17	10 55 29.38	1.9999	4 47 26.4	15.333	17	12 34 31.87	2.1622	7 56 8.4	15.976
18	10 57 29.41	2.0013	4 32 5.2	15.374	18	12 36 41.77	2.1678	8 12 6.3	15.953
19	10 59 29.53	2.0027	4 16 41.5	15.415	19	12 38 52.01	2.1736	8 28 2.7	15.928
20	11 1 29.73	2.0040	4 1 15.4	15.455	20	12 41 2.60	2.1794	8 43 57.7	15.903
21	11 3 30.01	2.0055	3 45 46.9	15.494	21	12 43 13.54	2.1853	8 59 51.1	15.876
22	11 5 30.39	2.0072	3 30 16.1	15.533	22	12 45 24.84	2.1914	9 15 42.8	15.847
23	11 7 30.87	2.0088	3 14 43.0	15.569	23	12 47 36.51	2.1975	9 31 32.7	15.815
24	11 9 31.45	2.0106	N. 2 59 7.8	15.604	24	12 49 48.54	2.2037	S. 9 47 20.6	15.782

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
TUESDAY 25.					THURSDAY 27.				
	h m s	s	"	"		h m s	s	"	"
0	12 49 48.54	2.2057	S. 9 47 20.6	15.782	0	14 44 5.08	2.5757	S. 21 7 57.5	11.723
1	12 52 0.95	2.2099	10 3 6.5	15.748	1	14 46 39.87	2.5839	21 19 36.7	11.583
2	12 54 13.73	2.2163	10 18 50.3	15.711	2	14 49 15.15	2.5922	21 31 7.4	11.440
3	12 56 26.90	2.2228	10 34 31.8	15.672	3	14 51 50.93	2.6004	21 42 29.5	11.294
4	12 58 40.46	2.2293	10 50 10.9	15.631	4	14 54 27.20	2.6086	21 53 42.7	11.146
5	13 0 54.42	2.2360	11 5 47.5	15.589	5	14 57 3.06	2.6167	22 4 47.0	10.997
6	13 3 8.78	2.2427	11 21 21.6	15.545	6	14 59 41.20	2.6248	22 15 42.3	10.845
7	13 5 23.54	2.2494	11 36 52.9	15.498	7	15 2 18.93	2.6328	22 26 28.4	10.690
8	13 7 38.71	2.2563	11 52 21.4	15.450	8	15 4 57.13	2.6406	22 37 5.1	10.533
9	13 9 54.29	2.2632	12 7 46.9	15.400	9	15 7 35.80	2.6485	22 47 32.4	10.374
10	13 12 10.29	2.2703	12 23 9.4	15.348	10	15 10 14.95	2.6563	22 57 50.0	10.213
11	13 14 26.72	2.2774	12 38 28.7	15.291	11	15 12 54.56	2.6640	23 7 57.9	10.050
12	13 16 43.58	2.2846	12 53 44.6	15.237	12	15 15 34.63	2.6717	23 17 56.0	9.885
13	13 19 0.87	2.2918	13 8 57.1	15.179	13	15 18 15.16	2.6792	23 27 44.1	9.717
14	13 21 18.60	2.2992	13 24 6.1	15.118	14	15 20 56.13	2.6868	23 37 22.0	9.547
15	13 23 36.77	2.3066	13 39 11.3	15.055	15	15 23 37.55	2.6940	23 46 49.7	9.375
16	13 25 55.39	2.3140	13 54 12.7	14.990	16	15 26 19.41	2.7013	23 56 7.0	9.201
17	13 28 14.45	2.3215	14 9 10.1	14.923	17	15 29 1.70	2.7083	24 5 13.8	9.025
18	13 30 33.97	2.3292	14 24 3.5	14.855	18	15 31 44.41	2.7153	24 14 10.0	8.848
19	13 32 53.95	2.3369	14 38 52.7	14.783	19	15 34 27.54	2.7222	24 22 55.5	8.668
20	13 35 14.40	2.3447	14 53 37.5	14.710	20	15 37 11.07	2.7289	24 31 30.1	8.486
21	13 37 35.31	2.3524	15 8 17.9	14.634	21	15 39 55.01	2.7356	24 39 53.8	8.302
22	13 39 56.69	2.3603	15 22 53.6	14.556	22	15 42 39.34	2.7420	24 48 6.3	8.116
23	13 42 18.54	2.3681	S. 15 37 24.6	14.476	23	15 45 24.05	2.7483	S. 24 56 7.7	7.929
WEDNESDAY 26.					FRIDAY 28.				
	h m s	s	"	"		h m s	s	"	"
0	13 44 40.86	2.3760	S. 15 51 50.7	14.394	0	15 48 9.14	2.7546	S. 25 3 57.8	7.739
1	13 47 3.66	2.3841	16 6 11.9	14.310	1	15 50 54.60	2.7607	25 11 36.4	7.543
2	13 49 26.95	2.3922	16 20 27.9	14.223	2	15 53 40.42	2.7666	25 19 3.6	7.357
3	13 51 50.72	2.4002	16 34 38.6	14.133	3	15 56 26.59	2.7723	25 26 19.2	7.160
4	13 54 14.98	2.4084	16 48 43.9	14.042	4	15 59 13.09	2.7778	25 33 23.0	6.965
5	13 56 39.73	2.4167	17 2 43.6	13.948	5	16 1 50.02	2.7832	25 40 15.0	6.768
6	13 59 4.98	2.4249	17 16 37.7	13.853	6	16 4 47.07	2.7884	25 46 55.1	6.568
7	14 1 30.72	2.4331	17 30 25.9	13.754	7	16 7 34.53	2.7935	25 53 23.2	6.363
8	14 3 56.95	2.4413	17 44 8.2	13.653	8	16 10 22.29	2.7983	25 59 39.3	6.167
9	14 6 23.68	2.4497	17 57 44.3	13.550	9	16 13 10.33	2.8030	26 5 43.2	5.963
10	14 8 50.91	2.4580	18 11 14.2	13.445	10	16 15 58.65	2.8075	26 11 34.9	5.759
11	14 11 18.64	2.4664	18 24 37.7	13.338	11	16 18 47.23	2.8118	26 17 14.3	5.553
12	14 13 46.88	2.4748	18 37 54.7	13.228	12	16 21 36.06	2.8158	26 22 41.3	5.346
13	14 16 15.62	2.4832	18 51 5.0	13.115	13	16 24 25.13	2.8197	26 27 55.8	5.138
14	14 18 44.86	2.4916	19 4 8.5	13.001	14	16 27 14.42	2.8233	26 32 57.8	4.928
15	14 21 14.61	2.5001	19 17 5.1	12.883	15	16 30 3.93	2.8268	26 37 47.2	4.718
16	14 23 44.87	2.5085	19 29 54.5	12.763	16	16 32 53.64	2.8301	26 42 23.9	4.506
17	14 26 15.63	2.5168	19 42 36.7	12.642	17	16 35 43.54	2.8331	26 46 47.9	4.294
18	14 28 46.89	2.5253	19 55 11.5	12.518	18	16 38 33.61	2.8358	26 50 59.2	4.082
19	14 31 18.66	2.5338	20 7 38.8	12.392	19	16 41 23.84	2.8384	26 54 57.7	3.868
20	14 33 50.94	2.5422	20 19 58.5	12.263	20	16 44 14.22	2.8408	26 58 43.3	3.653
21	14 36 23.72	2.5506	20 32 10.3	12.131	21	16 47 4.74	2.8429	27 2 16.0	3.437
22	14 38 57.01	2.5589	20 44 14.2	11.998	22	16 49 55.37	2.8448	27 5 35.7	3.221
23	14 41 30.79	2.5673	20 56 10.0	11.861	23	16 52 46.11	2.8465	27 8 42.5	3.005
24	14 44 5.08	2.5757	S. 21 7 57.5	11.723	24	16 55 36.95	2.8479	S. 27 11 36.3	2.788

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
SATURDAY 29.					MONDAY 31.				
	^h ^m ^s	^s	[°] ['] ["]	["]		^h ^m ^s	^s	[°] ['] ["]	["]
0	16 55 36.95	2.8479	S. 27 11 36.3	2.788	0	19 9 33.72	2.6548	S. 25 21 14.3	6.998
1	16 58 27.86	2.8491	27 14 17.0	2.570	1	19 12 12.76	2.6466	25 14 9.3	7.168
2	17 1 18.84	2.8501	27 16 44.7	2.353	2	19 14 51.31	2.6383	25 6 54.1	7.337
3	17 4 9.87	2.8508	27 18 59.3	2.134	3	19 17 29.35	2.6298	24 59 28.9	7.502
4	17 7 0.93	2.8513	27 21 0.8	1.916	4	19 20 6.88	2.6213	24 51 53.9	7.665
5	17 9 52.02	2.8515	27 22 49.2	1.697	5	19 22 43.90	2.6126	24 44 9.1	7.827
6	17 12 43.11	2.8514	27 24 24.4	1.478	6	19 25 20.39	2.6038	24 36 14.7	7.987
7	17 15 34.19	2.8512	27 25 46.6	1.261	7	19 27 56.36	2.5952	24 28 10.7	8.144
8	17 18 25.25	2.8507	27 26 55.7	1.042	8	19 30 31.81	2.5864	24 19 57.4	8.299
9	17 21 16.27	2.8499	27 27 51.6	0.823	9	19 33 6.73	2.5775	24 11 34.8	8.452
10	17 24 7.24	2.8490	27 28 34.4	0.605	10	19 35 41.11	2.5685	24 3 3.0	8.604
11	17 26 58.15	2.8478	27 29 4.2	0.388	11	19 38 14.95	2.5595	23 54 22.3	8.753
12	17 29 48.97	2.8463	27 29 20.9	-0.169	12	19 40 48.25	2.5504	23 45 32.7	8.900
13	17 32 39.70	2.8446	27 29 24.5	+0.049	13	19 43 21.00	2.5413	23 36 34.3	9.045
14	17 35 30.32	2.8426	27 29 15.0	0.266	14	19 45 53.20	2.5322	23 27 27.3	9.188
15	17 38 20.81	2.8404	27 28 52.6	0.482	15	19 48 24.86	2.5230	23 18 11.8	9.328
16	17 41 11.17	2.8380	27 28 17.2	0.698	16	19 50 55.96	2.5138	23 8 48.0	9.466
17	17 44 1.37	2.8353	27 27 28.9	0.913	17	19 53 26.51	2.5046	22 59 15.9	9.603
18	17 46 51.41	2.8325	27 26 27.6	1.128	18	19 55 56.51	2.4953	22 49 35.7	9.737
19	17 49 41.27	2.8294	27 25 13.5	1.342	19	19 58 25.95	2.4860	22 39 47.5	9.868
20	17 52 30.94	2.8261	27 23 46.6	1.555	20	20 0 54.83	2.4767	22 29 51.5	9.998
21	17 55 20.40	2.8225	27 22 6.9	1.768	21	20 3 23.15	2.4674	22 19 47.7	10.127
22	17 58 9.64	2.8188	27 20 14.5	1.978	22	20 5 50.92	2.4582	22 9 36.3	10.252
23	18 0 58.65	2.8148	S. 27 18 9.5	2.189	23	20 8 18.13	2.4488	S. 21 59 17.5	10.375
SUNDAY 30.					TUESDAY, JUNE 1.				
	^h ^m ^s	^s	[°] ['] ["]	["]		^h ^m ^s	^s	[°] ['] ["]	["]
0	18 3 47.41	2.8105	S. 27 15 51.8	2.399	0	20 10 44.78	2.4395	S. 21 48 51.3	10.497
1	18 6 35.91	2.8061	27 13 21.6	2.608	PHASES OF THE MOON.				
2	18 9 24.14	2.8014	27 10 38.9	2.814					
3	18 12 12.08	2.7965	27 7 43.9	3.020					
4	18 14 59.72	2.7915	27 4 36.5	3.226					
5	18 17 47.06	2.7863	27 1 16.8	3.429	<div> <div>☾ Last Quarter May</div> <div>● New Moon 13 15 31.0</div> <div>☾ First Quarter 21 16 50.0</div> <div>○ Full Moon 28 9 32.9</div> </div>				
6	18 20 34.08	2.7808	26 57 45.0	3.631					
7	18 23 20.76	2.7752	26 54 1.1	3.832					
8	18 26 7.10	2.7694	26 50 5.2	4.032					
9	18 28 53.09	2.7635	26 45 57.3	4.230	<div> <div>☾ Apogee May</div> <div>☾ Perigee 28 5.6</div> </div>				
10	18 31 38.72	2.7573	26 41 37.6	4.426					
11	18 34 23.97	2.7509	26 37 6.2	4.621					
12	18 37 8.83	2.7443	26 32 23.1	4.814					
13	18 39 53.29	2.7377	26 27 28.5	5.006					
14	18 42 37.35	2.7308	26 22 22.4	5.197					
15	18 45 20.99	2.7238	26 17 4.9	5.385					
16	18 48 4.21	2.7167	26 11 36.2	5.572					
17	18 50 46.99	2.7094	26 5 56.3	5.757					
18	18 53 29.34	2.7020	26 0 5.4	5.940					
19	18 56 11.23	2.6944	25 54 3.5	6.121					
20	18 58 52.67	2.6868	25 47 50.9	6.299					
21	19 1 33.65	2.6791	25 41 27.6	6.478					
22	19 4 14.16	2.6711	25 34 53.6	6.654					
23	19 6 54.18	2.6630	25 28 9.1	6.828					
24	19 9 33.72	2.6548	S. 25 21 14.3	6.998					

AT GREENWICH APPARENT NOON.

Day of the Week.	Day of the Month.	THE SUN'S						Sideral Time of Semidiameter Passing Meridian.	Equation of Time, to be Subtracted from	
		Apparent Right Ascension.	Diff. for 1 Hour.	Apparent Declination.	Diff. for 1 Hour.	Semidiameter.	Added to Apparent Time.			
		h m s	s	° ' "	"	' "	s	m s		
Tues.	1	4 33 2.15	10.215	N.21 56 51.0	+21.18	15 48.07	68.33	2 30.56		
Wed.	2	4 37 7.53	10.233	22 5 8.1	20.23	15 47.92	68.39	2 21.76		
Thur.	3	4 41 13.33	10.250	22 13 2.1	19.27	15 47.78	68.44	2 12.55		
Fri.	4	4 45 19.53	10.266	22 20 32.9	+18.30	15 47.64	68.50	2 2.93		
Sat.	5	4 49 26.11	10.282	22 27 40.4	17.32	15 47.50	68.55	1 52.93		
SUN.	6	4 53 33.06	10.297	22 34 24.3	16.33	15 47.37	68.60	1 42.57		
Mon.	7	4 57 40.36	10.311	22 40 44.5	+15.34	15 47.25	68.64	1 31.85		
Tues.	8	5 1 47.98	10.324	22 46 40.9	14.35	15 47.13	68.68	1 20.82		
Wed.	9	5 5 55.91	10.336	22 52 13.2	13.35	15 47.02	68.72	1 9.48		
Thur.	10	5 10 4.12	10.347	22 57 21.5	+12.34	15 46.91	68.76	0 57.87		
Fri.	11	5 14 12.58	10.357	23 2 5.5	11.33	15 46.80	68.79	0 46.00		
Sat.	12	5 18 21.27	10.366	23 6 25.1	10.31	15 46.70	68.82	0 33.90		
SUN.	13	5 22 30.17	10.374	23 10 20.4	+ 9.29	15 46.61	68.84	0 21.59		
Mon.	14	5 26 39.24	10.381	23 13 51.0	8.27	15 46.52	68.87	0 9.11		
Tues.	15	5 30 48.47	10.387	23 16 57.1	7.24	15 46.43	68.89	0 3.53		
Wed.	16	5 34 57.83	10.392	23 19 38.5	+ 6.21	15 46.35	68.91	0 16.29		
Thur.	17	5 39 7.29	10.396	23 21 55.2	5.18	15 46.28	68.92	0 29.16		
Fri.	18	5 43 16.82	10.398	23 23 47.1	4.15	15 46.21	68.93	0 42.09		
Sat.	19	5 47 26.40	10.399	23 25 14.3	+ 3.12	15 46.15	68.94	0 55.08		
SUN.	20	5 51 36.00	10.400	23 26 16.7	2.08	15 46.09	68.95	1 8.09		
Mon.	21	5 55 45.61	10.399	23 26 54.3	1.05	15 46.04	68.95	1 21.10		
Tues.	22	5 59 55.18	10.398	23 27 7.1	+ 0.02	15 45.99	68.95	1 34.08		
Wed.	23	6 4 4.71	10.395	23 26 55.1	- 1.01	15 45.94	68.94	1 47.01		
Thur.	24	6 8 14.16	10.392	23 26 18.4	2.04	15 45.90	68.93	1 59.87		
Fri.	25	6 12 23.53	10.388	23 25 17.0	- 3.07	15 45.86	68.92	2 12.64		
Sat.	26	6 16 32.78	10.383	23 23 50.9	4.10	15 45.82	68.91	2 25.31		
SUN.	27	6 20 41.92	10.377	23 22 0.1	5.13	15 45.79	68.89	2 37.84		
Mon.	28	6 24 50.90	10.371	23 19 44.7	- 6.15	15 45.76	68.87	2 50.24		
Tues.	29	6 28 59.73	10.364	23 17 4.8	7.17	15 45.73	68.84	3 2.47		
Wed.	30	6 33 8.37	10.356	23 14 0.4	8.19	15 45.71	68.81	3 14.53		
Thur.	31	6 37 16.82	10.347	N.23 10 31.5	- 9.21	15 45.69	68.78	3 26.38		

NOTE.—The mean time of semidiameter passing the meridian may be found by subtracting 0.19 from the time.

The sign + prefixed to the hourly change of declination indicates that north declinations are increasing sign — indicates that north declinations are decreasing.

AT GREENWICH MEAN NOON.

Day of the Week.	Day of the Month.	THE SUN'S				Equation of Time, to be Added to Subtracted from Mean Time.		Diff. for 1 Hour.	Sidereal Time, or Right Ascension of Mean Sun.
		Apparent Right Ascension.	Diff. for 1 Hour.	Apparent Declination.	Diff. for 1 Hour.	m	s		
		h m s	s	° ' "	"			s	h m s
Tues.	1	4 33 2.58	10.214	N. 21 56 51.9	+21.18	2	30.54	0.357	4 35 33.12
Wed.	2	4 37 7.93	10.232	22 5 8.9	20.22	2	21.75	0.375	4 39 29.68
Thur.	3	4 41 13.70	10.249	22 13 2.8	19.26	2	12.54	0.392	4 43 26.24
Fri.	4	4 45 19.88	10.265	22 20 33.6	+18.29	2	2.92	0.408	4 47 22.80
Sat.	5	4 49 26.44	10.281	22 27 40.9	17.31	1	52.92	0.424	4 51 19.35
SUN.	6	4 53 33.36	10.296	22 34 24.8	16.33	1	42.55	0.439	4 55 15.91
Mon.	7	4 57 40.63	10.310	22 40 44.9	+15.34	1	31.84	0.453	4 59 12.47
Tues.	8	5 1 48.22	10.323	22 46 41.2	14.35	1	20.81	0.466	5 3 9.03
Wed.	9	5 5 56.11	10.335	22 52 13.5	13.35	1	9.48	0.478	5 7 5.59
Thur.	10	5 10 4.28	10.346	22 57 21.7	+12.34	0	57.86	0.489	5 11 2.14
Fri.	11	5 14 12.71	10.356	23 2 5.6	11.33	0	45.99	0.499	5 14 58.70
Sat.	12	5 18 21.37	10.365	23 6 25.2	10.31	0	33.90	0.508	5 18 55.26
SUN.	13	5 22 30.23	10.373	23 10 20.4	+ 9.29	0	21.59	0.516	5 22 51.82
Mon.	14	5 26 39.27	10.380	23 13 51.0	8.26	0	9.11	0.523	5 26 48.38
Tues.	15	5 30 48.46	10.386	23 16 57.1	7.24	0	3.53	0.529	5 30 44.94
Wed.	16	5 34 57.78	10.390	23 19 38.5	+ 6.21	0	16.29	0.534	5 34 41.50
Thur.	17	5 39 7.20	10.394	23 21 55.2	5.18	0	29.15	0.538	5 38 38.05
Fri.	18	5 43 16.70	10.397	23 23 47.1	4.15	0	42.09	0.540	5 42 34.61
Sat.	19	5 47 26.24	10.398	23 25 14.3	+ 3.12	0	55.07	0.541	5 46 31.17
SUN.	20	5 51 35.81	10.399	23 26 16.7	2.08	1	8.08	0.542	5 50 27.73
Mon.	21	5 55 45.37	10.398	23 26 54.3	1.05	1	21.08	0.541	5 54 24.29
Tues.	22	5 59 54.91	10.396	23 27 7.1	+ 0.02	1	34.06	0.539	5 58 20.85
Wed.	23	6 4 4.40	10.394	23 26 55.2	- 1.01	1	46.99	0.537	6 2 17.40
Thur.	24	6 8 13.82	10.391	23 26 18.5	2.04	1	59.86	0.534	6 6 13.96
Fri.	25	6 12 23.14	10.387	23 25 17.1	- 3.07	2	12.62	0.530	6 10 10.52
Sat.	26	6 16 32.36	10.382	23 23 51.1	4.10	2	25.28	0.525	6 14 7.08
SUN.	27	6 20 41.46	10.376	23 22 0.4	5.13	2	37.82	0.519	6 18 3.64
Mon.	28	6 24 50.41	10.370	23 19 45.0	- 6.15	2	50.22	0.513	6 22 0.20
Tues.	29	6 28 59.20	10.363	23 17 5.2	7.17	3	2.45	0.506	6 25 56.76
Wed.	30	6 33 7.81	10.355	23 14 0.8	8.19	3	14.50	0.498	6 29 53.31
Thur.	31	6 37 16.23	10.346	N. 23 10 32.0	- 9.21	3	26.36	0.489	6 33 49.87

NOTE.—The semidiameter for mean noon may be assumed the same as that for apparent noon.

The sign + prefixed to the hourly change of declination indicates that north declinations are increasing; the sign - indicates that north declinations are decreasing.

Diff. for 1 Hour,
+0.8565.
(Table III.)

AT GREENWICH MEAN NOON.

Day of the Month.	Day of the Year.	THE SUN'S				Logarithm of the Radius Vector of the Earth.	Diff. for 1 Hour.	Mean Time of Sidereal Noon.
		True Longitude.		Diff. for 1 Hour.	Latitude.			
		λ	λ'					
		<div>° ' "</div>	<div>° ' "</div>	<div>"</div>	<div>"</div>			<div>h m s</div>
1	152	69 54 46.5	54 15.8	143.68	−0.05	0.006 1103	+27.9	19 21 16.11
2	153	70 52 14.4	51 43.6	143.65	+0.07	0.006 1766	27.3	19 17 20.20
3	154	71 49 41.6	49 10.6	143.62	0.20	0.006 2414	26.7	19 13 24.29
4	155	72 47 8.1	46 36.9	143.59	+0.32	0.006 3045	+26.0	19 9 28.38
5	156	73 44 34.0	44 2.6	143.56	0.44	0.006 3659	25.2	19 5 32.46
6	157	74 41 59.2	41 27.6	143.54	0.54	0.006 4253	24.3	19 1 36.55
7	158	75 39 23.8	38 52.0	143.51	+0.62	0.006 4826	+23.4	18 57 40.64
8	159	76 36 47.7	36 15.8	143.48	0.68	0.006 5378	22.5	18 53 44.73
9	160	77 34 11.0	33 38.9	143.46	0.71	0.006 5908	21.6	18 49 48.81
10	161	78 31 33.7	31 1.4	143.43	+0.73	0.006 6415	+20.6	18 45 52.90
11	162	79 28 55.7	28 23.2	143.41	0.71	0.006 6898	19.6	18 41 56.99
12	163	80 26 17.0	25 44.3	143.38	0.65	0.006 7356	18.6	18 38 1.08
13	164	81 23 37.7	23 4.8	143.35	+0.58	0.006 7789	+17.6	18 34 5.16
14	165	82 20 57.6	20 24.6	143.32	0.49	0.006 8198	16.5	18 30 9.25
15	166	83 18 16.8	17 43.6	143.29	0.38	0.006 8583	15.5	18 26 13.34
16	167	84 15 35.3	15 1.8	143.25	+0.25	0.006 8943	+14.5	18 22 17.43
17	168	85 12 53.0	12 19.4	143.22	+0.11	0.006 9279	13.5	18 18 21.52
18	169	86 10 10.0	9 36.1	143.19	−0.02	0.006 9592	12.6	18 14 25.60
19	170	87 7 26.1	6 52.1	143.16	−0.15	0.006 9883	+11.7	18 10 29.69
20	171	88 4 41.5	4 7.3	143.13	0.25	0.007 0152	10.8	18 6 33.78
21	172	89 1 56.2	1 21.8	143.10	0.34	0.007 0401	10.0	18 2 37.86
22	173	89 59 10.1	58 35.5	143.07	−0.42	0.007 0631	+9.2	17 58 41.95
23	174	90 56 23.3	55 48.6	143.04	0.45	0.007 0844	8.5	17 54 46.04
24	175	91 53 36.0	53 1.0	143.02	0.44	0.007 1041	7.9	17 50 50.13
25	176	92 50 48.1	50 12.9	143.00	−0.40	0.007 1223	+7.3	17 46 54.21
26	177	93 47 59.7	47 24.4	142.98	0.34	0.007 1391	6.7	17 42 58.30
27	178	94 45 11.1	44 35.6	142.97	0.25	0.007 1545	6.1	17 39 2.39
28	179	95 42 22.2	41 46.5	142.96	−0.14	0.007 1686	+5.6	17 35 6.48
29	180	96 39 33.3	38 57.4	142.96	0.00	0.007 1812	5.0	17 31 10.56
30	181	97 36 44.3	36 8.2	142.96	+0.14	0.007 1924	4.3	17 27 14.65
31	182	98 33 55.4	33 19.2	142.97	+0.26	0.007 2019	+3.6	17 23 18.74

NOTE.—The longitudes in the column λ are referred to the true equinox of their own date, while those in the column λ' are referred to the mean equinox of the beginning of the Besselian fictitious year.

Diff. for 1 Hour.
—9°.8296.
(Table II.)

GREENWICH MEAN TIME.

Day of the Month.	THE MOON'S									
	SEMIDIAMETER.		HORIZONTAL PARALLAX.				UPPER TRANSIT.		AGE.	
	Noon.	Midnight.	Noon.	Diff. for 1 Hour.	Midnight.	Diff. for 1 Hour.	Meridian of Greenwich.	Diff. for 1 Hour.	Noon.	
	' "	' "	' "	"	' "	"	h m	m	d	
1	16 12.0	16 4.3	59 21.51	-2.307	58 53.30	-2.385	16 10.8	2.21	18.4	
2	15 56.5	15 48.6	58 24.48	2.409	57 55.67	2.384	17 1.1	2.00	19.4	
3	15 40.9	15 33.5	57 27.41	2.320	57 0.14	2.221	17 47.0	1.85	20.4	
4	15 26.4	15 19.8	56 34.22	-2.095	56 9.95	-1.946	18 30.0	1.75	21.4	
5	15 13.7	15 8.2	55 47.56	1.783	55 27.19	1.610	19 11.4	1.71	22.4	
6	15 3.2	14 58.8	55 8.93	1.433	54 52.81	1.254	19 52.6	1.72	23.4	
7	14 55.0	14 51.8	54 38.84	-1.076	54 26.98	-0.903	20 34.6	1.78	24.4	
8	14 49.1	14 47.0	54 17.19	0.733	54 9.39	0.572	21 18.3	1.87	25.4	
9	14 45.4	14 44.2	54 3.47	0.419	53 59.34	0.274	22 4.3	1.97	26.4	
10	14 43.6	14 43.4	53 56.91	-0.136	53 56.08	-0.005	22 52.8	2.06	27.4	
11	14 43.5	14 44.1	53 56.76	+0.117	53 58.86	+0.232	23 43.2	2.13	28.4	
12	14 45.0	14 46.4	54 2.32	0.344	54 7.10	0.451	0	.	29.4	
13	14 48.0	14 50.0	54 13.15	+0.556	54 20.45	+0.660	0 34.7	2.15	0.7	
14	14 52.3	14 55.0	54 28.99	0.764	54 38.78	0.869	1 25.9	2.11	1.7	
15	14 58.0	15 1.4	54 49.84	0.975	55 2.19	1.084	2 15.9	2.05	2.7	
16	15 5.1	15 9.2	55 15.86	+1.195	55 30.88	+1.309	3 3.9	1.96	3.7	
17	15 13.6	15 18.5	55 47.27	1.423	56 5.04	1.537	3 50.0	1.89	4.7	
18	15 23.7	15 29.3	56 24.15	1.647	56 44.55	1.751	4 34.7	1.85	5.7	
19	15 35.1	15 41.3	57 6.14	+1.844	57 28.76	+1.923	5 19.0	1.85	6.7	
20	15 47.7	15 54.2	57 52.20	1.981	58 16.20	2.014	6 3.9	1.91	7.7	
21	16 0.8	16 7.4	58 40.40	2.014	59 4.39	1.978	6 51.1	2.03	8.7	
22	16 13.7	16 19.7	59 27.71	+1.901	59 49.82	+1.775	7 41.8	2.20	9.7	
23	16 25.3	16 30.1	60 10.11	1.598	60 27.98	1.373	8 37.4	2.43	10.7	
24	16 34.2	16 37.3	60 42.88	1.102	60 54.26	0.788	9 38.5	2.65	11.7	
25	16 39.3	16 40.1	61 1.65	+0.438	61 4.68	+0.064	10 43.9	2.78	12.7	
26	16 39.7	16 38.0	61 3.14	-0.320	60 57.01	-0.699	11 50.9	2.77	13.7	
27	16 35.2	16 31.1	60 46.43	1.061	60 31.65	1.396	12 55.8	2.61	14.7	
28	16 26.1	16 20.1	60 13.08	-1.691	59 51.26	-1.936	13 55.8	2.38	15.7	
29	16 13.5	16 6.3	59 26.84	2.125	59 0.49	2.258	14 50.1	2.15	16.7	
30	15 58.8	15 51.1	58 32.86	2.337	58 4.60	2.363	15 39.4	1.96	17.7	
31	15 43.4	15 35.8	57 36.33	-2.341	57 8.59	-2.275	16 24.7	1.83	18.7	

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	
TUESDAY 1.					THURSDAY 3.				
0	h m s	s	° ' "	"	0	h m s	s	° ' "	
0	20 10 44.78	2.4395	S. 21 48 51.3	10.497	0	21 57 52.16	2.0489	S. 11 42 38.6	
1	20 13 10.87	2.4302	21 38 17.9	10.616	1	21 59 54.91	2.0427	11 28 32.8	
2	20 15 36.40	2.4209	21 27 37.4	10.733	2	22 1 57.28	2.0364	11 14 25.0	
3	20 18 1.38	2.4117	21 16 49.9	10.848	3	22 3 59.28	2.0303	11 0 15.3	
4	20 20 25.80	2.4024	21 5 55.6	10.961	4	22 6 0.92	2.0244	10 46 3.6	
5	20 22 49.67	2.3933	20 54 54.6	11.072	5	22 8 2.21	2.0185	10 31 50.2	
6	20 25 12.99	2.3840	20 43 47.0	11.181	6	22 10 3.14	2.0127	10 17 35.1	
7	20 27 35.75	2.3748	20 32 32.9	11.288	7	22 12 3.73	2.0069	10 3 18.3	
8	20 29 57.96	2.3656	20 21 12.5	11.393	8	22 14 3.97	2.0013	9 48 59.9	
9	20 32 19.62	2.3565	20 9 45.8	11.496	9	22 16 3.88	1.9958	9 34 40.1	
10	20 34 40.74	2.3474	19 58 13.0	11.596	10	22 18 3.46	1.9903	9 20 18.8	
11	20 37 1.31	2.3383	19 46 34.3	11.694	11	22 20 2.72	1.9851	9 5 56.2	
12	20 39 21.34	2.3293	19 34 49.7	11.791	12	22 22 1.67	1.9798	8 51 32.3	
13	20 41 40.83	2.3204	19 22 59.4	11.886	13	22 24 0.30	1.9747	8 37 7.2	
14	20 43 59.79	2.3115	19 11 3.4	11.978	14	22 25 58.63	1.9696	8 22 41.0	
15	20 46 18.21	2.3026	18 59 2.0	12.068	15	22 27 56.65	1.9646	8 8 13.7	
16	20 48 36.10	2.2938	18 46 55.2	12.158	16	22 29 54.38	1.9598	7 53 45.5	
17	20 50 53.46	2.2850	18 34 43.1	12.245	17	22 31 51.82	1.9549	7 39 16.3	
18	20 53 10.30	2.2763	18 22 25.8	12.330	18	22 33 48.97	1.9503	7 24 46.3	
19	20 55 26.62	2.2677	18 10 3.5	12.413	19	22 35 45.85	1.9457	7 10 15.4	
20	20 57 42.42	2.2590	17 57 36.3	12.493	20	22 37 42.45	1.9411	6 55 43.8	
21	20 59 57.70	2.2504	17 45 4.3	12.573	21	22 39 38.78	1.9367	6 41 11.5	
22	21 2 12.47	2.2420	17 32 27.5	12.652	22	22 41 34.85	1.9324	6 26 38.7	
23	21 4 26.74	2.2337	S. 17 19 46.1	12.727	23	22 43 30.67	1.9283	S. 6 12 5.3	
WEDNESDAY 2.					FRIDAY 4.				
0	21 6 40.51	2.2253	S. 17 7 0.3	12.800	0	22 45 26.24	1.9241	S. 5 57 31.4	
1	21 8 53.78	2.2170	16 54 10.1	12.873	1	22 47 21.56	1.9200	5 42 57.1	
2	21 11 6.55	2.2088	16 41 15.6	12.943	2	22 49 16.64	1.9161	5 28 22.4	
3	21 13 18.84	2.2008	16 28 17.0	13.011	3	22 51 11.49	1.9123	5 13 47.5	
4	21 15 30.64	2.1927	16 15 14.3	13.078	4	22 53 6.11	1.9084	4 59 12.3	
5	21 17 41.96	2.1847	16 2 7.6	13.143	5	22 55 0.50	1.9048	4 44 36.9	
6	21 19 52.80	2.1768	15 48 57.1	13.207	6	22 56 54.68	1.9012	4 30 1.4	
7	21 22 3.17	2.1690	15 35 42.8	13.268	7	22 58 48.64	1.8977	4 15 25.8	
8	21 24 13.08	2.1613	15 22 24.9	13.328	8	23 0 42.40	1.8943	4 0 50.3	
9	21 26 22.52	2.1536	15 9 3.4	13.388	9	23 2 35.96	1.8910	3 46 14.8	
10	21 28 31.51	2.1460	14 55 38.4	13.444	10	23 4 29.32	1.8878	3 31 39.4	
11	21 30 40.04	2.1385	14 42 10.1	13.498	11	23 6 22.49	1.8846	3 17 4.1	
12	21 32 48.13	2.1311	14 28 38.6	13.552	12	23 8 15.47	1.8815	3 2 29.1	
13	21 34 55.77	2.1238	14 15 3.9	13.604	13	23 10 8.27	1.8786	2 47 54.3	
14	21 37 2.98	2.1166	14 1 26.1	13.655	14	23 12 0.90	1.8758	2 33 19.9	
15	21 39 9.76	2.1094	13 47 45.3	13.704	15	23 13 53.36	1.8729	2 18 45.8	
16	21 41 16.11	2.1023	13 34 1.6	13.752	16	23 15 45.65	1.8703	2 4 12.1	
17	21 43 22.04	2.0953	13 20 15.1	13.798	17	23 17 37.79	1.8677	1 49 38.9	
18	21 45 27.55	2.0884	13 6 25.9	13.844	18	23 19 29.77	1.8651	1 35 6.2	
19	21 47 32.65	2.0816	12 52 34.1	13.885	19	23 21 21.60	1.8627	1 20 34.1	
20	21 49 37.34	2.0748	12 38 39.7	13.927	20	23 23 13.20	1.8603	1 6 2.7	
21	21 51 41.63	2.0683	12 24 42.9	13.967	21	23 25 4.84	1.8581	0 51 31.9	
22	21 53 45.53	2.0618	12 10 43.7	14.005	22	23 26 56.26	1.8559	0 37 1.8	
23	21 55 49.04	2.0553	11 56 42.3	14.043	23	23 28 47.55	1.8538	0 22 32.5	
24	21 57 52.16	2.0489	S. 11 42 38.6	14.079	24	23 30 38.72	1.8518	S. 0 8 4.1	

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
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SATURDAY 5.				MONDAY 7.			
h m s	s	"	"	h m s	s	"	"
23 30 38.72	1.8518	S. 0 8 4.1	14.467	0 0 58 44.84	1.8478	N. 10 55 44.9	12.917
23 32 29.77	1.8499	N. 0 6 23.5	14.452	1 1 0 35.76	1.8494	11 8 38.4	12.867
23 34 20.71	1.8482	0 20 50.1	14.436	2 1 2 26.77	1.8511	11 21 28.9	12.817
23 36 11.55	1.8464	0 35 15.8	14.420	3 1 4 17.89	1.8529	11 34 16.4	12.766
23 38 2.28	1.8447	0 49 40.5	14.403	4 1 6 9.12	1.8547	11 47 0.8	12.714
23 39 52.91	1.8431	1 4 4.1	14.384	5 1 8 0.45	1.8565	11 59 42.1	12.662
23 41 43.45	1.8416	1 18 26.6	14.365	6 1 9 51.90	1.8586	12 12 20.2	12.608
23 43 33.90	1.8402	1 32 47.9	14.345	7 1 11 43.48	1.8607	12 24 55.0	12.553
23 45 24.27	1.8388	1 47 8.0	14.325	8 1 13 35.18	1.8627	12 37 26.6	12.500
23 47 14.56	1.8376	2 1 26.9	14.304	9 1 15 27.00	1.8648	12 49 55.0	12.445
23 49 4.78	1.8364	2 15 44.5	14.283	10 1 17 18.95	1.8669	13 2 20.0	12.388
23 50 54.93	1.8353	2 30 0.8	14.259	11 1 19 11.03	1.8692	13 14 41.6	12.332
23 52 45.02	1.8343	2 44 15.6	14.235	12 1 21 3.25	1.8715	13 26 59.8	12.274
23 54 35.05	1.8334	2 58 29.0	14.212	13 1 22 55.61	1.8738	13 39 14.5	12.216
23 56 25.03	1.8326	3 12 41.0	14.188	14 1 24 48.11	1.8762	13 51 25.7	12.158
23 58 14.96	1.8318	3 26 51.5	14.162	15 1 26 40.75	1.8787	14 3 33.4	12.098
0 0 4.84	1.8311	3 41 0.4	14.135	16 1 28 33.55	1.8813	14 15 37.4	12.037
0 1 54.69	1.8305	3 55 7.7	14.108	17 1 30 26.50	1.8838	14 27 37.8	11.976
0 3 44.50	1.8299	4 9 13.3	14.079	18 1 32 19.60	1.8864	14 39 34.5	11.914
0 5 34.28	1.8294	4 23 17.2	14.051	19 1 34 12.87	1.8891	14 51 27.5	11.852
0 7 24.03	1.8290	4 37 19.4	14.023	20 1 36 6.20	1.8918	15 3 16.7	11.788
0 9 13.76	1.8288	4 51 19.9	13.993	21 1 37 59.88	1.8946	15 15 2.1	11.724
0 11 3.48	1.8285	5 5 18.5	13.962	22 1 39 53.64	1.8973	15 26 43.6	11.658
0 12 53.18	1.8283	5 19 15.3	13.930	23 1 41 47.56	1.9002	N. 15 38 21.1	11.593

SUNDAY 6.				TUESDAY 8.			
h m s	s	"	"	h m s	s	"	"
0 14 42.88	1.8283	N. 5 33 10.1	13.898	0 1 43 41.66	1.9032	N. 15 49 54.7	11.527
0 16 32.57	1.8283	5 47 3.0	13.865	1 1 45 35.94	1.9061	16 1 24.3	11.460
0 18 22.27	1.8283	6 0 53.9	13.831	2 1 47 30.39	1.9090	16 12 49.9	11.393
0 20 11.97	1.8285	6 14 42.7	13.797	3 1 49 25.02	1.9121	16 24 11.4	11.323
0 22 1.69	1.8288	6 28 29.5	13.763	4 1 51 19.84	1.9153	16 35 28.7	11.254
0 23 51.42	1.8290	6 42 14.2	13.727	5 1 53 14.85	1.9183	16 46 41.9	11.184
0 25 41.17	1.8293	6 55 56.7	13.690	6 1 55 10.04	1.9215	16 57 50.8	11.113
0 27 30.94	1.8298	7 9 37.0	13.653	7 1 57 5.43	1.9248	17 8 55.5	11.042
0 29 20.74	1.8303	7 23 15.1	13.616	8 1 59 1.01	1.9279	17 19 55.8	10.969
0 31 10.58	1.8309	7 36 50.9	13.577	9 2 0 56.78	1.9313	17 30 51.8	10.897
0 33 0.45	1.8315	7 50 24.3	13.538	10 2 2 52.76	1.9347	17 41 43.4	10.823
0 34 50.36	1.8323	8 3 55.4	13.498	11 2 4 48.94	1.9380	17 52 30.5	10.748
0 36 40.32	1.8331	8 17 24.1	13.458	12 2 6 45.32	1.9414	18 3 13.1	10.673
0 38 30.33	1.8339	8 30 50.3	13.416	13 2 8 41.91	1.9448	18 13 51.2	10.597
0 40 20.39	1.8348	8 44 14.0	13.374	14 2 10 38.70	1.9483	18 24 24.7	10.519
0 42 10.51	1.8358	8 57 35.2	13.332	15 2 12 35.70	1.9518	18 34 53.5	10.441
0 44 0.69	1.8369	9 10 53.8	13.288	16 2 14 32.91	1.9553	18 45 17.6	10.363
0 45 50.94	1.8381	9 24 9.8	13.244	17 2 16 30.33	1.9588	18 55 37.1	10.284
0 47 41.26	1.8393	9 37 23.1	13.200	18 2 18 27.97	1.9625	19 5 51.7	10.203
0 49 31.65	1.8405	9 50 33.8	13.155	19 2 20 25.83	1.9661	19 16 1.5	10.123
0 51 22.12	1.8418	10 3 41.7	13.108	20 2 22 23.90	1.9697	19 26 6.5	10.042
0 53 12.67	1.8432	10 16 46.8	13.061	21 2 24 22.19	1.9734	19 36 6.5	9.959
0 55 3.30	1.8446	10 29 49.0	13.013	22 2 26 20.71	1.9772	19 46 1.6	9.876
0 56 54.02	1.8462	10 42 48.4	12.966	23 2 28 19.45	1.9808	19 55 51.6	9.792
0 58 44.84	1.8478	N. 10 55 44.9	12.917	24 2 30 18.41	1.9846	N. 20 5 36.6	9.708

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.			Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.			Diff. for 1 Min.	Declination.		
WEDNESDAY 9.							FRIDAY 11.							
0	h	m	s	s	°	'	0	h	m	s	s	°	'	
1	2	30	18.41	1.9846	N. 20	5 36.6	9.708	1	4	9	59.43	2.1643	N. 25	59 4.8
2	2	32	17.60	1.9883	20	15 16.5	9.622	2	4	12	9.38	2.1673	26	3 45.3
3	2	34	17.01	1.9922	20	24 51.2	9.535	3	4	14	19.51	2.1703	26	8 18.5
4	2	36	16.66	1.9960	20	34 20.7	9.448	4	4	16	29.82	2.1733	26	12 44.4
5	2	38	16.53	1.9998	20	43 44.9	9.360	5	4	18	40.31	2.1763	26	17 2.9
6	2	40	16.63	2.0036	20	53 3.9	9.272	6	4	20	50.98	2.1793	26	21 14.1
7	2	42	16.96	2.0074	21	2 17.5	9.182	7	4	23	1.83	2.1822	26	25 17.8
8	2	44	17.52	2.0113	21	11 25.7	9.091	8	4	25	12.84	2.1849	26	29 14.1
9	2	46	18.32	2.0153	21	20 28.4	9.000	9	4	27	24.02	2.1877	26	33 3.0
10	2	48	19.35	2.0191	21	29 25.7	8.908	10	4	29	35.36	2.1904	26	36 44.3
11	2	50	20.61	2.0230	21	38 17.4	8.815	11	4	31	46.87	2.1931	26	40 18.1
12	2	52	22.11	2.0269	21	47 3.5	8.722	12	4	33	58.53	2.1956	26	43 44.3
13	2	54	23.84	2.0308	21	55 44.0	8.628	13	4	36	10.34	2.1981	26	47 3.0
14	2	56	25.81	2.0348	22	4 18.8	8.533	14	4	38	22.30	2.2006	26	50 14.0
15	2	58	28.01	2.0387	22	12 47.9	8.437	15	4	40	34.41	2.2029	26	53 17.4
16	3	0	30.45	2.0427	22	21 11.2	8.340	16	4	42	46.65	2.2053	26	56 13.1
17	3	2	33.13	2.0466	22	29 28.7	8.243	17	4	44	59.03	2.2075	26	59 1.1
18	3	4	36.04	2.0505	22	37 40.4	8.145	18	4	47	11.55	2.2097	27	1 41.4
19	3	6	39.19	2.0544	22	45 46.1	8.046	19	4	49	24.19	2.2117	27	4 13.9
20	3	8	42.57	2.0583	22	53 45.9	7.947	20	4	51	36.95	2.2138	27	6 38.6
21	3	10	46.19	2.0623	23	1 39.7	7.846	21	4	53	49.84	2.2158	27	8 55.5
22	3	12	50.05	2.0663	23	9 27.4	7.744	22	4	56	2.85	2.2177	27	11 4.6
23	3	14	54.14	2.0701	23	17 9.0	7.642	23	4	58	15.96	2.2194	27	13 5.9
24	3	16	58.46	2.0740	N. 23	24 44.4	7.539	24	5	0	29.18	2.2212	N. 27	14 59.3
THURSDAY 10.							SATURDAY 12.							
0	3	19	3.02	2.0779	N. 23	32 13.7	7.436	0	5	2	42.50	2.2228	N. 27	16 44.8
1	3	21	7.81	2.0818	23	39 36.7	7.332	1	5	4	55.92	2.2244	27	18 22.4
2	3	23	12.83	2.0857	23	46 53.5	7.228	2	5	7	9.43	2.2259	27	19 52.1
3	3	25	18.09	2.0896	23	54 4.0	7.122	3	5	9	23.03	2.2273	27	21 13.8
4	3	27	23.58	2.0934	24	1 8.1	7.014	4	5	11	36.71	2.2287	27	22 27.6
5	3	29	29.30	2.0972	24	8 5.7	6.907	5	5	13	50.47	2.2300	27	23 33.4
6	3	31	35.24	2.1009	24	14 56.9	6.799	6	5	16	4.31	2.2312	27	24 31.3
7	3	33	41.41	2.1048	24	21 41.6	6.690	7	5	18	18.21	2.2323	27	25 21.1
8	3	35	47.81	2.1085	24	28 19.7	6.581	8	5	20	32.18	2.2333	27	26 3.0
9	3	37	54.43	2.1122	24	34 51.3	6.471	9	5	22	46.21	2.2343	27	26 36.8
10	3	40	1.27	2.1159	24	41 16.2	6.359	10	5	25	0.30	2.2352	27	27 2.6
11	3	42	8.34	2.1196	24	47 34.4	6.248	11	5	27	14.43	2.2359	27	27 20.3
12	3	44	15.62	2.1233	24	53 45.9	6.135	12	5	29	28.61	2.2367	27	27 30.0
13	3	46	23.13	2.1269	24	59 50.6	6.023	13	5	31	42.83	2.2373	27	27 31.6
14	3	48	30.85	2.1304	25	5 48.6	5.909	14	5	33	57.08	2.2378	27	27 25.1
15	3	50	38.78	2.1339	25	11 39.7	5.794	15	5	36	11.37	2.2383	27	27 10.6
16	3	52	46.92	2.1375	25	17 23.9	5.678	16	5	38	25.68	2.2387	27	26 48.0
17	3	54	55.28	2.1410	25	23 1.1	5.563	17	5	40	40.01	2.2390	27	26 17.3
18	3	57	3.84	2.1444	25	28 31.4	5.447	18	5	42	54.36	2.2393	27	25 38.6
19	3	59	12.61	2.1478	25	33 54.7	5.330	19	5	45	8.72	2.2394	27	24 51.7
20	4	1	21.58	2.1512	25	39 11.0	5.213	20	5	47	23.09	2.2395	27	23 56.8
21	4	3	30.75	2.1544	25	44 20.2	5.093	21	5	49	37.46	2.2394	27	22 53.8
22	4	5	40.11	2.1577	25	49 22.2	4.974	22	5	51	51.82	2.2393	27	21 42.7
23	4	7	49.67	2.1610	25	54 17.1	4.855	23	5	54	6.17	2.2391	27	20 23.5
24	4	9	59.43	2.1643	N. 25	59 4.8	4.735	24	5	56	20.51	2.2388	N. 27	18 56.2

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
SUNDAY 13.					TUESDAY 15.			
h m s	s	° ' "	"		h m s	s	° ' "	"
5 56 20.51	2.2388	N. 27 18 56.2	1.523	0	7 42 8.09	2.1466	N. 23 35 29.2	7.628
5 58 34.83	2.2385	27 17 20.8	1.657	1	7 44 16.81	2.1438	23 27 48.1	7.743
6 0 49.13	2.2381	27 15 37.4	1.791	2	7 46 25.35	2.1408	23 20 0.1	7.857
6 3 3.40	2.2375	27 13 45.9	1.925	3	7 48 33.70	2.1376	23 12 5.3	7.970
6 5 17.63	2.2369	27 11 46.4	2.059	4	7 50 41.86	2.1345	23 4 3.7	8.083
6 7 31.83	2.2363	27 9 38.8	2.194	5	7 52 49.84	2.1314	22 55 55.4	8.194
6 9 45.99	2.2356	27 7 23.1	2.328	6	7 54 57.63	2.1283	22 47 40.4	8.305
6 12 0.10	2.2348	27 4 59.4	2.462	7	7 57 5.23	2.1251	22 39 18.8	8.416
6 14 14.16	2.2338	27 2 27.7	2.595	8	7 59 12.64	2.1219	22 30 50.5	8.526
6 16 28.16	2.2328	26 59 48.0	2.728	9	8 1 19.86	2.1188	22 22 15.7	8.634
6 18 42.10	2.2318	26 57 0.3	2.862	10	8 3 26.89	2.1156	22 13 34.4	8.743
6 20 55.97	2.2306	26 54 4.6	2.994	11	8 5 33.73	2.1123	22 4 46.6	8.850
6 23 9.77	2.2294	26 51 1.0	3.127	12	8 7 40.37	2.1091	21 55 52.4	8.957
6 25 23.50	2.2282	26 47 49.4	3.260	13	8 9 46.82	2.1059	21 46 51.8	9.063
6 27 37.15	2.2268	26 44 29.8	3.393	14	8 11 53.08	2.1028	21 37 44.9	9.168
6 29 50.72	2.2254	26 41 2.3	3.524	15	8 13 59.15	2.0995	21 28 31.7	9.273
6 32 4.20	2.2239	26 37 26.9	3.656	16	8 16 5.02	2.0963	21 19 12.2	9.376
6 34 17.59	2.2224	26 33 43.6	3.787	17	8 18 10.70	2.0931	21 9 46.6	9.478
6 36 30.89	2.2208	26 29 52.5	3.918	18	8 20 16.19	2.0898	21 0 14.8	9.581
6 38 44.09	2.2191	26 25 53.5	4.048	19	8 22 21.48	2.0866	20 50 36.9	9.683
6 40 57.18	2.2173	26 21 46.7	4.178	20	8 24 26.58	2.0834	20 40 52.9	9.783
6 43 10.17	2.2155	26 17 32.1	4.308	21	8 26 31.49	2.0802	20 31 2.9	9.883
6 45 23.04	2.2136	26 13 9.7	4.438	22	8 28 36.20	2.0770	20 21 7.0	9.983
6 47 35.80	2.2117	N. 26 8 39.6	4.567	23	8 30 40.73	2.0739	N. 20 11 5.1	10.080
MONDAY 14.					WEDNESDAY 16.			
6 49 48.44	2.2097	N. 26 4 1.7	4.696	0	8 32 45.07	2.0708	N. 20 0 57.4	10.178
6 52 0.96	2.2076	25 59 16.1	4.824	1	8 34 49.22	2.0676	19 50 43.8	10.274
6 54 13.35	2.2054	25 54 22.8	4.952	2	8 36 53.18	2.0645	19 40 24.5	10.370
6 56 25.61	2.2033	25 49 21.9	5.079	3	8 38 56.96	2.0614	19 29 59.4	10.465
6 58 37.74	2.2011	25 44 13.3	5.207	4	8 41 0.55	2.0583	19 19 28.7	10.559
7 0 49.74	2.1988	25 38 57.1	5.333	5	8 43 3.95	2.0552	19 8 52.3	10.653
7 3 1.60	2.1964	25 33 33.4	5.458	6	8 45 7.17	2.0520	18 58 10.4	10.745
7 5 13.31	2.1940	25 28 2.1	5.583	7	8 47 10.21	2.0492	18 47 22.9	10.838
7 7 24.88	2.1916	25 22 23.4	5.708	8	8 49 13.07	2.0462	18 36 29.9	10.928
7 9 36.30	2.1891	25 16 37.1	5.833	9	8 51 15.75	2.0432	18 25 31.5	11.018
7 11 47.57	2.1866	25 10 43.4	5.957	10	8 53 18.25	2.0403	18 14 27.7	11.108
7 13 58.69	2.1840	25 4 42.3	6.080	11	8 55 20.58	2.0373	18 3 18.6	11.196
7 16 9.65	2.1813	24 58 33.8	6.203	12	8 57 22.73	2.0344	17 52 4.2	11.284
7 18 20.45	2.1787	24 52 18.0	6.323	13	8 59 24.71	2.0316	17 40 44.5	11.371
7 20 31.09	2.1759	24 45 54.8	6.447	14	9 1 26.52	2.0288	17 29 19.7	11.456
7 22 41.56	2.1732	24 39 24.4	6.568	15	9 3 28.16	2.0259	17 17 49.8	11.543
7 24 51.87	2.1704	24 32 46.7	6.688	16	9 5 29.63	2.0232	17 6 14.7	11.627
7 27 2.01	2.1676	24 26 1.8	6.808	17	9 7 30.94	2.0205	16 54 34.6	11.710
7 29 11.98	2.1647	24 19 9.8	6.927	18	9 9 32.09	2.0178	16 42 49.5	11.793
7 31 21.77	2.1618	24 12 10.6	7.045	19	9 11 33.07	2.0151	16 30 59.5	11.875
7 33 31.39	2.1588	24 5 4.4	7.163	20	9 13 33.90	2.0125	16 19 4.5	11.957
7 35 40.83	2.1559	23 57 51.1	7.280	21	9 15 34.57	2.0099	16 7 4.7	12.036
7 37 50.10	2.1530	23 50 30.8	7.397	22	9 17 35.09	2.0074	15 55 0.2	12.115
7 39 59.19	2.1499	23 43 3.5	7.513	23	9 19 35.46	2.0049	15 42 50.9	12.194
7 42 8.09	2.1468	N. 23 35 29.2	7.628	24	9 21 35.68	2.0025	N. 15 30 36.9	12.273

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.
THURSDAY 17.					SATURDAY 19.			
0	h m s	s	° ' "	"	0	h m s	s	° ' "
0	9 21 35.68	2.0025	N. 15 30 36.9	12.272	0	10 55 56.67	1.9540	N. 4 28 14.5
1	9 23 35.76	2.0001	15 18 18.3	12.348	1	10 57 53.93	1.9548	4 13 14.0
2	9 25 35.69	1.9977	15 5 55.1	12.425	2	10 59 51.24	1.9556	3 58 11.5
3	9 27 35.48	1.9953	14 53 27.3	12.500	3	11 1 48.60	1.9565	3 43 7.0
4	9 29 35.13	1.9931	14 40 55.1	12.574	4	11 3 46.02	1.9575	3 28 0.5
5	9 31 34.65	1.9909	14 28 18.4	12.648	5	11 5 43.50	1.9585	3 12 52.2
6	9 33 34.04	1.9888	14 15 37.1	12.721	6	11 7 41.04	1.9597	2 57 42.0
7	9 35 33.30	1.9866	14 2 51.9	12.793	7	11 9 38.66	1.9609	2 42 30.1
8	9 37 32.43	1.9845	13 50 2.2	12.863	8	11 11 36.35	1.9623	2 27 16.5
9	9 39 31.44	1.9825	13 37 8.3	12.933	9	11 13 34.13	1.9637	2 12 1.2
10	9 41 30.33	1.9806	13 24 10.2	13.002	10	11 15 31.99	1.9652	1 56 44.4
11	9 43 29.11	1.9787	13 11 8.0	13.071	11	11 17 29.95	1.9668	1 41 26.1
12	9 45 27.77	1.9768	12 58 1.7	13.138	12	11 19 28.00	1.9684	1 26 6.3
13	9 47 26.32	1.9750	12 44 51.4	13.205	13	11 21 26.16	1.9702	1 10 45.1
14	9 49 24.77	1.9733	12 31 37.1	13.272	14	11 23 24.42	1.9720	0 55 22.6
15	9 51 23.12	1.9717	12 18 18.8	13.337	15	11 25 22.80	1.9740	0 39 58.8
16	9 53 21.37	1.9700	12 4 56.7	13.401	16	11 27 21.30	1.9760	0 24 33.8
17	9 55 19.52	1.9684	11 51 30.7	13.464	17	11 29 19.92	1.9781	N. 0 9 7.7
18	9 57 17.58	1.9669	11 38 1.0	13.527	18	11 31 18.67	1.9803	S. 0 6 19.5
19	9 59 15.55	1.9655	11 24 27.5	13.588	19	11 33 17.55	1.9825	0 21 47.7
20	10 1 13.44	1.9642	11 10 50.4	13.648	20	11 35 16.57	1.9849	0 37 16.9
21	10 3 11.25	1.9629	10 57 9.7	13.708	21	11 37 15.74	1.9874	0 52 46.9
22	10 5 8.99	1.9617	10 43 25.4	13.768	22	11 39 15.06	1.9900	1 8 17.7
23	10 7 6.65	1.9604	N. 10 29 37.6	13.826	23	11 41 14.54	1.9927	S. 1 23 49.3
FRIDAY 18.					SUNDAY 20.			
0	10 9 4.24	1.9593	N. 10 15 46.3	13.883	0	11 43 14.18	1.9954	S. 1 39 21.6
1	10 11 1.77	1.9583	10 1 51.6	13.940	1	11 45 13.99	1.9983	1 54 54.5
2	10 12 59.23	1.9573	9 47 53.5	13.995	2	11 47 13.97	2.0012	2 10 27.9
3	10 14 56.64	1.9564	9 33 52.2	14.049	3	11 49 14.13	2.0043	2 26 1.8
4	10 16 54.00	1.9556	9 19 47.6	14.103	4	11 51 14.48	2.0073	2 41 36.1
5	10 18 51.31	1.9548	9 5 39.8	14.157	5	11 53 15.01	2.0105	2 57 10.7
6	10 20 48.57	1.9541	8 51 28.8	14.208	6	11 55 15.74	2.0138	3 12 45.6
7	10 22 45.80	1.9534	8 37 14.8	14.259	7	11 57 16.67	2.0173	3 28 20.7
8	10 24 42.98	1.9528	8 22 57.7	14.310	8	11 59 17.81	2.0208	3 43 55.9
9	10 26 40.14	1.9524	8 8 37.6	14.359	9	12 1 19.16	2.0243	3 59 31.1
10	10 28 37.27	1.9519	7 54 14.6	14.408	10	12 3 20.72	2.0279	4 15 6.3
11	10 30 34.37	1.9516	7 39 48.7	14.456	11	12 5 22.51	2.0318	4 30 41.3
12	10 32 31.46	1.9513	7 25 19.9	14.503	12	12 7 24.53	2.0356	4 46 16.2
13	10 34 28.53	1.9511	7 10 48.4	14.548	13	12 9 26.78	2.0395	5 1 50.8
14	10 36 25.59	1.9510	6 56 14.2	14.593	14	12 11 29.27	2.0436	5 17 25.1
15	10 38 22.65	1.9509	6 41 37.3	14.637	15	12 13 32.01	2.0478	5 32 59.0
16	10 40 19.70	1.9509	6 26 57.8	14.679	16	12 15 35.00	2.0520	5 48 32.4
17	10 42 16.76	1.9511	6 12 15.8	14.722	17	12 17 38.25	2.0563	6 4 5.2
18	10 44 13.83	1.9513	5 57 31.2	14.763	18	12 19 41.76	2.0608	6 19 37.3
19	10 46 10.91	1.9515	5 42 44.2	14.803	19	12 21 45.54	2.0653	6 35 8.7
20	10 48 8.01	1.9518	5 27 54.8	14.843	20	12 23 49.59	2.0699	6 50 39.3
21	10 50 5.13	1.9522	5 13 3.1	14.881	21	12 25 53.93	2.0747	7 6 9.0
22	10 52 2.27	1.9527	4 58 9.1	14.918	22	12 27 58.55	2.0794	7 21 37.7
23	10 53 59.45	1.9533	4 43 12.9	14.955	23	12 30 3.46	2.0843	7 37 5.3
24	10 55 56.67	1.9540	N. 4 28 14.5	14.991	24	12 32 8.67	2.0893	S. 7 52 31.7

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
MONDAY 21.					WEDNESDAY 23.				
0	h m s	s	° ' "	"	0	h m s	s	° ' "	"
1	12 32 8.67	2.0893	S. 7 52 31.7	15.430	1	14 19 51.17	2.4269	S. 19 19 0.4	12.468
2	12 34 14.18	2.0944	8 7 56.9	15.409	2	14 22 17.04	2.4334	19 31 25.2	12.358
3	12 36 20.00	2.0997	8 23 20.8	15.387	3	14 24 43.42	2.4440	19 43 43.3	12.245
4	12 38 26.14	2.1049	8 38 43.3	15.363	4	14 27 10.32	2.4526	19 55 54.6	12.131
5	12 40 32.59	2.1103	8 54 4.3	15.336	5	14 29 37.73	2.4611	20 7 59.0	12.015
6	12 42 39.37	2.1158	9 9 23.6	15.308	6	14 32 5.65	2.4697	20 19 56.4	11.897
7	12 44 46.48	2.1213	9 24 41.3	15.280	7	14 34 34.09	2.4783	20 31 46.6	11.776
8	12 46 53.92	2.1269	9 39 57.2	15.249	8	14 37 3.04	2.4868	20 43 29.5	11.653
9	12 49 1.71	2.1328	9 55 11.2	15.217	9	14 39 32.50	2.4953	20 55 5.0	11.528
10	12 51 9.85	2.1386	10 10 23.2	15.183	10	14 42 2.48	2.5039	21 6 32.9	11.401
11	12 53 18.34	2.1445	10 25 33.2	15.148	11	14 44 32.97	2.5125	21 17 53.1	11.271
12	12 55 27.19	2.1505	10 40 41.0	15.111	12	14 47 3.98	2.5211	21 29 5.4	11.139
13	12 57 36.40	2.1566	10 55 46.5	15.073	13	14 49 35.50	2.5296	21 40 9.8	11.006
14	12 59 45.98	2.1628	11 10 49.7	15.033	14	14 52 7.53	2.5382	21 51 6.1	10.870
15	13 1 55.94	2.1691	11 25 50.4	14.991	15	14 54 40.08	2.5467	22 1 54.2	10.732
16	13 4 6.27	2.1754	11 40 48.6	14.948	16	14 57 13.13	2.5551	22 12 33.9	10.592
17	13 6 16.99	2.1819	11 55 44.1	14.903	17	14 59 46.69	2.5636	22 23 5.2	10.449
18	13 8 28.10	2.1884	12 10 36.9	14.856	18	15 2 20.76	2.5720	22 33 27.8	10.304
19	13 10 39.60	2.1951	12 25 26.8	14.807	19	15 4 55.33	2.5803	22 43 41.7	10.158
20	13 12 51.51	2.2018	12 40 13.7	14.756	20	15 7 30.39	2.5885	22 53 46.7	10.008
21	13 15 3.82	2.2086	12 54 57.5	14.704	21	15 10 5.95	2.5968	23 3 42.7	9.858
22	13 17 16.54	2.2155	13 9 38.2	14.651	22	15 12 42.01	2.6051	23 13 29.6	9.704
23	13 19 29.68	2.2225	13 24 15.6	14.595	23	15 15 18.56	2.6132	23 23 7.2	9.549
24	13 21 43.24	2.2296	S. 13 38 49.6	14.537	24	15 17 55.59	2.6212	S. 23 32 35.5	9.392
TUESDAY 22.					THURSDAY 24.				
0	13 23 57.23	2.2366	S. 13 53 20.0	14.478	0	15 20 33.10	2.6292	S. 23 41 54.2	9.232
1	13 26 11.64	2.2438	14 7 46.9	14.417	1	15 23 11.09	2.6374	23 51 3.3	9.070
2	13 28 26.49	2.2512	14 22 10.0	14.353	2	15 25 49.56	2.6451	24 0 2.6	8.907
3	13 30 41.78	2.2585	14 36 29.3	14.289	3	15 28 28.50	2.6528	24 8 52.1	8.742
4	13 32 57.51	2.2659	14 50 44.7	14.223	4	15 31 7.90	2.6604	24 17 31.6	8.573
5	13 35 13.69	2.2734	15 4 56.0	14.153	5	15 33 47.75	2.6680	24 26 0.9	8.403
6	13 37 30.32	2.2810	15 19 3.1	14.083	6	15 36 28.06	2.6755	24 34 20.0	8.233
7	13 39 47.41	2.2887	15 33 5.9	14.011	7	15 39 8.81	2.6828	24 42 28.8	8.059
8	13 42 4.96	2.2963	15 47 4.4	13.937	8	15 41 50.00	2.6901	24 50 27.1	7.883
9	13 44 22.97	2.3041	16 0 58.3	13.859	9	15 44 31.62	2.6973	24 58 14.8	7.705
10	13 46 41.45	2.3119	16 14 47.5	13.780	10	15 47 13.67	2.7043	25 5 51.7	7.526
11	13 49 0.40	2.3198	16 28 31.9	13.700	11	15 49 56.13	2.7112	25 13 17.9	7.346
12	13 51 19.83	2.3278	16 42 11.5	13.618	12	15 52 39.01	2.7180	25 20 33.2	7.163
13	13 53 39.73	2.3358	16 55 46.1	13.533	13	15 55 22.29	2.7246	25 27 37.4	6.978
14	13 56 0.12	2.3438	17 9 15.5	13.447	14	15 58 5.96	2.7310	25 34 30.5	6.792
15	13 58 20.99	2.3519	17 22 39.7	13.358	15	16 0 50.01	2.7373	25 41 12.4	6.603
16	14 0 42.35	2.3602	17 35 58.5	13.268	16	16 3 34.44	2.7436	25 47 42.9	6.413
17	14 3 4.21	2.3684	17 49 11.8	13.175	17	16 6 19.24	2.7497	25 54 2.0	6.222
18	14 5 26.56	2.3766	18 2 19.5	13.080	18	16 9 4.40	2.7555	26 0 9.5	6.029
19	14 7 49.40	2.3849	18 15 21.4	12.983	19	16 11 49.90	2.7612	26 6 5.5	5.835
20	14 10 12.75	2.3933	18 28 17.5	12.885	20	16 14 35.74	2.7668	26 11 49.7	5.638
21	14 12 36.60	2.4017	18 41 7.6	12.783	21	16 17 21.91	2.7721	26 17 22.1	5.442
22	14 15 0.95	2.4101	18 53 51.5	12.679	22	16 20 8.39	2.7773	26 22 42.7	5.243
23	14 17 25.81	2.4185	19 6 29.1	12.574	23	16 22 55.18	2.7823	26 27 51.3	5.043
24	14 19 51.17	2.4269	S. 19 19 0.4	12.468	24	16 25 42.27	2.7872	S. 26 32 47.8	4.840

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.
FRIDAY 25.					SUNDAY 27.			
	h m s	s	" "	" "		h m s	s	" "
0	16 25 42.27	2.7872	S. 26 32 47.8	4.840	0	18 40 52.84	2.7579	S. 26 21 37.2
1	16 28 29.64	2.7918	26 37 32.1	4.638	1	18 43 38.14	2.7520	26 16 16.4
2	16 31 17.29	2.7963	26 42 4.3	4.434	2	18 46 23.08	2.7459	26 10 44.0
3	16 34 5.20	2.8005	26 46 24.2	4.229	3	18 49 7.65	2.7397	26 5 0.0
4	16 36 53.35	2.8045	26 50 31.8	4.023	4	18 51 51.84	2.7333	25 59 4.6
5	16 39 41.74	2.8083	26 54 26.9	3.815	5	18 54 35.65	2.7268	25 52 57.9
6	16 42 30.35	2.8119	26 58 9.6	3.607	6	18 57 19.06	2.7201	25 46 40.0
7	16 45 19.17	2.8153	27 1 39.7	3.398	7	19 0 2.06	2.7132	25 40 10.9
8	16 48 8.10	2.8185	27 4 57.3	3.188	8	19 2 44.64	2.7062	25 33 30.8
9	16 50 57.39	2.8215	27 8 2.2	2.976	9	19 5 26.80	2.6991	25 26 39.8
10	16 53 46.77	2.8243	27 10 54.4	2.764	10	19 8 8.53	2.6918	25 19 37.9
11	16 56 36.30	2.8268	27 13 33.9	2.553	11	19 10 49.82	2.6845	25 12 25.3
12	16 59 25.98	2.8292	27 16 0.7	2.339	12	19 13 30.67	2.6770	25 5 2.2
13	17 2 15.80	2.8313	27 18 14.6	2.125	13	19 16 11.06	2.6693	24 57 28.6
14	17 5 5.73	2.8330	27 20 15.7	1.911	14	19 18 50.98	2.6614	24 49 44.7
15	17 7 55.76	2.8346	27 22 3.9	1.696	15	19 21 30.43	2.6536	24 41 50.6
16	17 10 45.88	2.8360	27 23 39.2	1.481	16	19 24 9.41	2.6457	24 33 46.4
17	17 13 36.08	2.8372	27 25 1.6	1.266	17	19 26 47.91	2.6376	24 25 32.2
18	17 16 26.34	2.8380	27 26 11.1	1.050	18	19 29 25.92	2.6294	24 17 8.1
19	17 19 16.64	2.8387	27 27 7.6	0.833	19	19 32 3.44	2.6213	24 8 34.2
20	17 22 6.98	2.8392	27 27 51.1	0.618	20	19 34 40.47	2.6130	23 59 50.7
21	17 24 57.34	2.8393	27 28 21.7	0.402	21	19 37 17.00	2.6046	23 50 57.7
22	17 27 47.70	2.8393	27 28 39.3	-0.185	22	19 39 53.02	2.5962	23 41 55.3
23	17 30 38.06	2.8391	S. 27 28 43.9	+0.032	23	19 42 28.53	2.5875	S. 23 32 43.7
SATURDAY 26.					MONDAY 28.			
	h m s	s	" "	" "		h m s	s	" "
0	17 33 28.39	2.8385	S. 27 28 35.5	0.248	0	19 45 3.52	2.5789	S. 23 23 23.0
1	17 36 18.68	2.8378	27 28 14.1	0.464	1	19 47 38.00	2.5703	23 13 53.3
2	17 39 8.92	2.8368	27 27 39.8	0.679	2	19 50 11.95	2.5615	23 4 14.8
3	17 41 59.09	2.8355	27 26 52.6	0.895	3	19 52 45.38	2.5528	22 54 27.5
4	17 44 49.18	2.8340	27 25 52.4	1.110	4	19 55 18.28	2.5439	22 44 31.7
5	17 47 39.17	2.8323	27 24 39.4	1.324	5	19 57 50.65	2.5351	22 34 27.4
6	17 50 29.05	2.8303	27 23 13.5	1.539	6	20 0 22.49	2.5263	22 24 14.8
7	17 53 18.81	2.8282	27 21 34.7	1.753	7	20 2 53.80	2.5173	22 13 54.0
8	17 56 8.43	2.8258	27 19 43.2	1.965	8	20 5 24.57	2.5083	22 3 25.1
9	17 58 57.90	2.8231	27 17 38.9	2.178	9	20 7 54.80	2.4993	21 52 48.3
10	18 1 47.20	2.8203	27 15 21.8	2.390	10	20 10 24.49	2.4904	21 42 3.7
11	18 4 36.33	2.8172	27 12 52.1	2.601	11	20 12 53.65	2.4814	21 31 11.4
12	18 7 25.26	2.8138	27 10 9.7	2.812	12	20 15 22.26	2.4723	21 20 11.6
13	18 10 13.99	2.8103	27 7 14.7	3.021	13	20 17 50.33	2.4633	21 9 4.4
14	18 13 2.50	2.8066	27 4 7.2	3.229	14	20 20 17.86	2.4543	20 57 49.9
15	18 15 50.78	2.8026	27 0 47.2	3.437	15	20 22 44.85	2.4453	20 46 28.3
16	18 18 38.81	2.7984	26 57 14.8	3.643	16	20 25 11.30	2.4363	20 34 59.7
17	18 21 26.59	2.7940	26 53 30.0	3.848	17	20 27 37.21	2.4273	20 23 24.2
18	18 24 14.09	2.7894	26 49 33.0	4.052	18	20 30 2.58	2.4183	20 11 42.0
19	18 27 1.32	2.7848	26 45 23.8	4.255	19	20 32 27.41	2.4094	19 59 53.1
20	18 29 48.26	2.7798	26 41 2.4	4.457	20	20 34 51.71	2.4004	19 47 57.8
21	18 32 34.89	2.7745	26 36 29.0	4.657	21	20 37 15.46	2.3914	19 35 56.1
22	18 35 21.20	2.7692	26 31 43.6	4.856	22	20 39 38.68	2.3826	19 23 48.2
23	18 38 7.19	2.7637	26 26 46.3	5.053	23	20 42 1.37	2.3738	19 11 34.2
24	18 40 52.84	2.7579	S. 26 21 37.2	5.249	24	20 44 23.53	2.3648	S. 18 59 14.3

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Mer.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
TUESDAY 29.					THURSDAY, JULY 1.				
	h m s	s	° ' "	"		h m s	s	° ' "	"
0	20 44 23.53	2.3648	S. 18 59 14.3	12.381	0	22 28 49.32	2.0158	S. 7 48 24.6	14.908
1	20 46 45.15	2.3560	18 46 48.5	12.478					
2	20 49 6.25	2.3473	18 34 17.0	12.572					
3	20 51 26.82	2.3385	18 21 39.9	12.664					
4	20 53 46.87	2.3298	18 8 57.3	12.754					
5	20 56 6.40	2.3212	17 56 9.4	12.843					
6	20 58 25.41	2.3126	17 43 16.2	12.928					
7	21 0 43.91	2.3041	17 30 18.0	13.012					
8	21 3 1.90	2.2955	17 17 14.8	13.093					
9	21 5 19.37	2.2870	17 4 6.8	13.173					
10	21 7 36.34	2.2787	16 50 54.0	13.252					
11	21 9 52.81	2.2703	16 37 36.6	13.327					
12	21 12 8.78	2.2621	16 24 14.8	13.400					
13	21 14 24.26	2.2539	16 10 48.6	13.473					
14	21 16 39.25	2.2458	15 57 18.1	13.543					
15	21 18 53.75	2.2376	15 43 43.5	13.611	PHASES OF THE MOON.				
16	21 21 7.76	2.2296	15 30 4.8	13.678					
17	21 23 21.30	2.2217	15 16 22.2	13.742					
18	21 25 34.36	2.2138	15 2 35.8	13.804					
19	21 27 46.95	2.2060	14 48 45.7	13.864					
20	21 29 59.08	2.1983	14 34 52.1	13.923					
21	21 32 10.75	2.1907	14 20 55.0	13.981					
22	21 34 21.96	2.1830	14 6 54.4	14.036					
23	21 36 32.71	2.1755	S. 13 52 50.6	14.089					
WEDNESDAY 30.									
0	21 38 43.02	2.1682	S. 13 38 43.7	14.140					
1	21 40 52.89	2.1608	13 24 33.8	14.190					
2	21 43 2.32	2.1535	13 10 20.9	14.239					
3	21 45 11.31	2.1463	12 56 5.1	14.286					
4	21 47 19.88	2.1393	12 41 46.6	14.331					
5	21 49 28.03	2.1323	12 27 25.4	14.374					
6	21 51 35.76	2.1253	12 13 1.7	14.416					
7	21 53 43.07	2.1185	11 58 35.5	14.456					
8	21 55 49.98	2.1118	11 44 7.0	14.494					
9	21 57 56.48	2.1050	11 29 36.2	14.532					
10	22 0 2.58	2.0984	11 15 3.2	14.567					
11	22 2 8.29	2.0920	11 0 28.2	14.600					
12	22 4 13.62	2.0856	10 45 51.2	14.633					
13	22 6 18.56	2.0793	10 31 12.3	14.663					
14	22 8 23.13	2.0731	10 16 31.6	14.693					
15	22 10 27.33	2.0670	10 1 49.2	14.720					
16	22 12 31.17	2.0609	9 47 5.2	14.747					
17	22 14 34.64	2.0548	9 32 19.6	14.772					
18	22 16 37.75	2.0490	9 17 32.6	14.795					
19	22 18 40.52	2.0433	9 2 44.2	14.818					
20	22 20 42.95	2.0377	8 47 54.5	14.838					
21	22 22 45.04	2.0320	8 33 3.7	14.857					
22	22 24 46.79	2.0265	8 18 11.7	14.876					
23	22 26 48.22	2.0211	8 3 18.6	14.893					
24	22 28 49.32	2.0158	S. 7 48 24.6	14.908					

AT GREENWICH APPARENT NOON.

Day of the Week.	Day of the Month.	THE SUN'S					Sideral Time of Semidiameter Passing Meridian.	Equation of Time, to be Added to Apparent Time.
		Apparent Right Ascension.	Diff. for 1 Hour.	Apparent Declination.	Diff. for 1 Hour.	Semidiameter.		
		h m s	s	° ' "	"	' "	s	m s
Thur.	1	6 37 16.82	10.347	N.23 10 31.5	-9.21	15 45.69	68.78	3 26.38
Fri.	2	6 41 25.05	10.338	23 6 38.3	10.22	15 45.67	68.75	3 38.02
Sat.	3	6 45 33.04	10.328	23 2 20.8	11.23	15 45.66	68.71	3 49.43
SUN.	4	6 49 40.78	10.316	22 57 39.2	-12.24	15 45.65	68.67	4 0.57
Mon.	5	6 53 48.23	10.304	22 52 33.4	13.24	15 45.64	68.63	4 11.44
Tues.	6	6 57 55.38	10.291	22 47 3.8	14.23	15 45.64	68.58	4 22.00
Wed.	7	7 2 2.21	10.277	22 41 10.3	-15.22	15 45.65	68.53	4 32.24
Thur.	8	7 6 8.69	10.262	22 34 53.1	16.20	15 45.66	68.48	4 42.14
Fri.	9	7 10 14.81	10.247	22 28 12.4	17.18	15 45.68	68.42	4 51.67
Sat.	10	7 14 20.54	10.230	22 21 8.4	-18.15	15 45.70	68.36	5 0.82
SUN.	11	7 18 25.86	10.213	22 13 41.2	19.11	15 45.72	68.30	5 9.56
Mon.	12	7 22 30.75	10.195	22 5 51.0	20.07	15 45.75	68.24	5 17.87
Tues.	13	7 26 35.20	10.176	21 57 37.9	-21.01	15 45.79	68.17	5 25.74
Wed.	14	7 30 39.18	10.156	21 49 2.3	21.95	15 45.84	68.11	5 33.14
Thur.	15	7 34 42.68	10.135	21 40 4.3	22.88	15 45.89	68.04	5 40.06
Fri.	16	7 38 45.67	10.114	21 30 44.1	-23.80	15 45.94	67.97	5 46.48
Sat.	17	7 42 48.14	10.092	21 21 2.0	24.71	15 46.00	67.90	5 52.37
SUN.	18	7 46 50.08	10.069	21 10 58.1	25.61	15 46.06	67.83	5 57.74
Mon.	19	7 50 51.47	10.046	21 0 32.9	-26.50	15 46.13	67.76	6 2.56
Tues.	20	7 54 52.30	10.023	20 49 46.3	27.38	15 46.21	67.69	6 6.82
Wed.	21	7 58 52.56	9.999	20 38 38.8	28.24	15 46.29	67.61	6 10.52
Thur.	22	8 2 52.25	9.975	20 27 10.6	-29.10	15 46.37	67.53	6 13.64
Fri.	23	8 6 51.34	9.950	20 15 21.9	29.95	15 46.46	67.45	6 16.17
Sat.	24	8 10 49.85	9.926	20 3 12.9	30.79	15 46.55	67.37	6 18.12
SUN.	25	8 14 47.78	9.901	19 50 43.9	-31.62	15 46.64	67.28	6 19.48
Mon.	26	8 18 45.10	9.877	19 37 55.2	32.44	15 46.73	67.20	6 20.25
Tues.	27	8 22 41.84	9.852	19 24 46.9	33.25	15 46.83	67.11	6 20.43
Wed.	28	8 26 37.98	9.827	19 11 19.2	-34.05	15 46.93	67.03	6 20.01
Thur.	29	8 30 33.54	9.802	18 57 32.6	34.84	15 47.03	66.94	6 19.01
Fri.	30	8 34 28.50	9.778	18 43 27.2	35.61	15 47.14	66.85	6 17.42
Sat.	31	8 38 22.87	9.753	18 29 3.2	36.38	15 47.25	66.76	6 15.24
SUN.	32	8 42 16.66	9.728	N.18 14 20.9	-37.14	15 47.36	66.68	6 12.48

NORR.—The mean time of semidiameter passing the meridian may be found by subtracting 0°.19 from the time.

The sign — prefixed to the hourly change of declination indicates that north declinations are decreas-

AT GREENWICH MEAN NOON.

Day of the Week.	Day of the Month.	THE SUN'S				Equation of Time, to be Subtracted from Mean Time.	Diff. for 1 Hour.	Sidereal Time, or Right Ascension of Mean Sun.
		Apparent Right Ascension.	Diff. for 1 Hour.	Apparent Declination.	Diff. for 1 Hour.			
		h m s	s	° ' "	"	m s	s	h m s
Thur.	1	6 37 16.23	10.346	N. 23 10 32.0	-9.21	3 26.36	0.489	6 33 49.87
Fri.	2	6 41 24.42	10.337	23 6 38.9	10.22	3 38.00	0.480	6 37 46.43
Sat.	3	6 45 32.38	10.326	23 2 21.5	11.23	3 49.40	0.470	6 41 42.99
SUN.	4	6 49 40.09	10.315	22 57 40.0	-12.23	4 0.54	0.459	6 45 39.55
Mon.	5	6 53 47.51	10.303	22 52 34.4	13.23	4 11.41	0.446	6 49 36.10
Tues.	6	6 57 54.64	10.290	22 47 4.8	14.23	4 21.97	0.433	6 53 32.66
Wed.	7	7 2 1.43	10.276	22 41 11.4	-15.22	4 32.21	0.419	6 57 29.22
Thur.	8	7 6 7.89	10.261	22 34 54.4	16.20	4 42.11	0.405	7 1 25.78
Fri.	9	7 10 13.98	10.246	22 28 13.8	17.18	4 51.64	0.389	7 5 22.34
Sat.	10	7 14 19.68	10.229	22 21 9.9	-18.15	5 0.78	0.372	7 9 18.90
SUN.	11	7 18 24.98	10.212	22 13 42.9	19.11	5 9.53	0.355	7 13 15.45
Mon.	12	7 22 29.85	10.194	22 5 52.8	20.06	5 17.84	0.337	7 17 12.01
Tues.	13	7 26 34.28	10.175	21 57 39.8	-21.01	5 25.71	0.318	7 21 8.57
Wed.	14	7 30 38.24	10.155	21 49 4.3	21.95	5 33.11	0.298	7 25 5.13
Thur.	15	7 34 41.72	10.134	21 40 6.4	22.87	5 40.03	0.278	7 29 1.69
Fri.	16	7 38 44.69	10.113	21 30 46.4	-23.79	5 46.45	0.257	7 32 58.24
Sat.	17	7 42 47.15	10.091	21 21 4.4	24.70	5 52.35	0.235	7 36 54.80
SUN.	18	7 46 49.08	10.069	21 11 0.7	25.60	5 57.72	0.212	7 40 51.36
Mon.	19	7 50 50.46	10.046	21 0 35.5	-26.49	6 2.54	0.189	7 44 47.92
Tues.	20	7 54 51.28	10.022	20 49 49.1	27.37	6 6.80	0.166	7 48 44.47
Wed.	21	7 58 51.53	9.998	20 38 41.7	28.24	6 10.50	0.142	7 52 41.03
Thur.	22	8 2 51.21	9.974	20 27 13.6	-29.10	6 13.62	0.118	7 56 37.59
Fri.	23	8 6 50.30	9.950	20 15 25.0	29.95	6 16.16	0.093	8 0 34.14
Sat.	24	8 10 48.81	9.926	20 3 16.1	30.79	6 18.11	0.069	8 4 30.70
SUN.	25	8 14 46.73	9.901	19 50 47.2	-31.62	6 19.47	0.044	8 8 27.26
Mon.	26	8 18 44.06	9.876	19 37 58.6	32.44	6 20.24	0.020	8 12 23.82
Tues.	27	8 22 40.80	9.852	19 24 50.4	33.24	6 20.43	0.005	8 16 20.37
Wed.	28	8 26 36.95	9.827	19 11 22.8	-34.04	6 20.02	0.029	8 20 16.93
Thur.	29	8 30 32.50	9.803	18 57 36.3	34.83	6 19.02	0.054	8 24 13.49
Fri.	30	8 34 27.47	9.778	18 43 30.9	35.61	6 17.43	0.078	8 28 10.04
Sat.	31	8 38 21.86	9.754	18 29 7.0	36.38	6 15.25	0.103	8 32 6.60
SUN.	32	8 42 15.65	9.729	N. 18 14 24.8	-37.14	6 12.49	0.127	8 36 3.16

NOTE.—The semidiameter for mean noon may be assumed the same as that for apparent noon.
 The sign — prefixed to the hourly change of declination indicates that north declinations are decreasing.

Diff. for 1 Hour,
 +9°.8565.
 (Table III.)

AT GREENWICH MEAN NOON.

Day of the Month.	Day of the Year.	THE SUN'S				Logarithm of the Radius Vector of the Earth.	Diff. for 1 Hour.	Mean Time of Sidereal Noon.
		True Longitude.		Diff. for 1 Hour.	Latitude.			
		λ	λ'					
		$^{\circ}$ $'$ $''$	$^{\circ}$ $'$ $''$	$''$	$''$			h m s
1	182	98 33' 55.4	33 19.2	142.97	+ 0.26	0.007 2019	+ 3.6	17 23 18.74
2	183	99 31' 6.7	30 30.3	142.97	0.38	0.007 2098	2.9	17 19 22.83
3	184	100 28' 18.2	27 41.6	142.98	0.49	0.007 2158	2.1	17 15 26.91
4	185	101 25' 30.0	24 53.1	142.99	+ 0.58	0.007 2199	+ 1.2	17 11 31.00
5	186	102 22' 42.0	22 4.9	143.00	0.65	0.007 2218	+ 0.3	17 7 35.09
6	187	103 19' 54.2	19 17.0	143.02	0.68	0.007 2216	- 0.6	17 3 39.18
7	188	104 17' 6.8	16 29.4	143.03	+ 0.70	0.007 2190	- 1.6	16 59 43.26
8	189	105 14' 19.7	13 42.1	143.04	0.68	0.007 2141	2.6	16 55 47.35
9	190	106 11' 32.8	10 55.1	143.05	0.63	0.007 2068	3.6	16 51 51.44
10	191	107 8' 46.3	8 8.3	143.07	+ 0.57	0.007 1969	- 4.6	16 47 55.53
11	192	108 6' 0.0	5 21.9	143.08	0.48	0.007 1846	5.7	16 43 59.62
12	193	109 3' 14.0	2 35.7	143.09	0.37	0.007 1696	6.8	16 40 3.70
13	194	109 60' 28.3	59 49.8	143.10	+ 0.24	0.007 1521	- 7.8	16 36 7.79
14	195	110 57' 42.8	57 4.1	143.11	+ 0.11	0.007 1320	8.9	16 32 11.88
15	196	111 54' 57.5	54 18.6	143.12	- 0.03	0.007 1094	10.0	16 28 15.97
16	197	112 52' 12.3	51 33.3	143.12	- 0.17	0.007 0842	-11.0	16 24 20.06
17	198	113 49' 27.4	48 48.2	143.13	0.29	0.007 0567	12.0	16 20 24.14
18	199	114 46' 42.6	46 3.2	143.14	0.38	0.007 0268	12.9	16 16 28.23
19	200	115 43' 58.0	43 18.4	143.14	- 0.45	0.006 9948	-13.8	16 12 32.32
20	201	116 41' 13.5	40 33.8	143.15	0.50	0.006 9606	14.6	16 8 36.41
21	202	117 38' 29.3	37 49.4	143.16	0.51	0.006 9247	15.3	16 4 40.50
22	203	118 35' 45.3	35 5.2	143.17	- 0.48	0.006 8869	-16.0	16 0 44.59
23	204	119 33' 1.6	32 21.4	143.19	0.42	0.006 8476	16.6	15 56 48.68
24	205	120 30' 18.3	29 37.9	143.21	0.33	0.006 8068	17.2	15 52 52.76
25	206	121 27' 35.5	26 54.9	143.23	- 0.22	0.006 7647	-17.8	15 48 56.85
26	207	122 24' 53.2	24 12.5	143.26	- 0.09	0.006 7212	18.4	15 45 0.94
27	208	123 22' 11.7	21 30.8	143.29	+ 0.05	0.006 6766	18.9	15 41 5.03
28	209	124 19' 30.9	18 49.9	143.33	+ 0.18	0.006 6306	-19.4	15 37 9.12
29	210	125 16' 51.1	16 9.9	143.36	0.31	0.006 5832	20.0	15 33 13.21
30	211	126 14' 12.2	13 30.8	143.40	0.43	0.006 5345	20.6	15 29 17.30
31	212	127 11' 34.4	10 52.8	143.45	0.52	0.006 4843	21.3	15 25 21.38
32	213	128 8' 57.6	8 15.9	143.50	+ 0.58	0.006 4325	-22.0	15 21 25.47

NOTE.—The longitudes in the column λ are referred to the true equinox of their own date, while those in the column λ' are referred to the mean equinox of the beginning of the Besselian fictitious year.

Diff. for 1 Hour,
—9°.8296.
(Table II.)

GREENWICH MEAN TIME.

Day of the Month.	THE MOON'S									
	SEMI- DIAMETER.		HORIZONTAL PARALLAX.				UPPER TRANSIT.		AGE.	
	Noon.	Midnight.	Noon.	Diff. for 1 Hour.	Midnight.	Diff. for 1 Hour.	Meridian of Greenwich.	Diff. for 1 Hour.	Noon.	
	' "	' "	' "	"	' "	"	h m	m	d	
1	15 43.4	15 35.8	57 36.33	-2.341	57 8.59	-2.275	16 24.7	1.83	18.7	
2	15 28.5	15 21.6	56 41.87	2.173	56 16.57	2.039	17 7.7	1.76	19.7	
3	15 15.2	15 9.3	55 53.02	1.882	55 31.47	1.706	17 49.7	1.75	20.7	
4	15 4.1	14 59.4	55 12.12	-1.517	54 55.09	-1.320	18 31.9	1.78	21.7	
5	14 55.4	14 52.1	54 40.46	1.118	54 28.26	0.916	19 15.3	1.85	22.7	
6	14 49.5	14 47.4	54 18.48	0.715	54 11.08	0.519	20 0.7	1.94	23.7	
7	14 46.0	14 45.3	54 5.99	-0.331	54 3.10	-0.152	20 48.4	2.04	24.7	
8	14 45.0	14 45.4	54 2.30	+0.017	54 3.45	+0.173	21 38.3	2.11	25.7	
9	14 46.2	14 47.4	54 6.41	0.318	54 11.03	0.451	22 29.7	2.15	26.7	
10	14 49.1	14 51.2	54 17.18	+0.572	54 24.71	+0.681	23 21.4	2.15	27.7	
11	14 53.5	14 56.2	54 33.48	0.778	54 43.35	0.865	6	.	28.7	
12	14 59.2	15 2.4	54 54.21	0.943	55 5.95	1.012	0 12.3	2.08	0.1	
13	15 5.8	15 9.4	55 18.48	+1.075	55 31.73	+1.133	1 1.3	2.00	1.1	
14	15 13.2	15 17.2	55 45.65	1.186	56 0.18	1.235	1 48.4	1.92	2.1	
15	15 21.3	15 25.6	56 15.29	1.282	56 30.95	1.328	2 33.7	1.86	3.1	
16	15 30.0	15 34.5	56 47.15	+1.372	57 3.86	+1.412	3 18.0	1.84	4.1	
17	15 39.2	15 44.0	57 21.01	1.445	57 38.52	1.472	4 2.3	1.86	5.1	
18	15 48.8	15 53.7	57 56.30	1.490	58 14.23	1.496	4 47.8	1.94	6.1	
19	15 58.6	16 3.4	58 32.14	+1.486	58 49.81	+1.454	5 36.0	2.08	7.1	
20	16 8.1	16 12.5	59 6.94	1.396	59 23.21	1.310	6 28.0	2.27	8.1	
21	16 16.6	16 20.2	59 38.26	1.192	59 51.70	1.042	7 25.0	2.48	9.1	
22	16 23.4	16 25.8	60 3.14	+0.859	60 12.18	+0.642	8 26.6	2.65	10.1	
23	16 27.5	16 28.4	60 18.42	+0.393	60 21.51	+0.119	9 31.5	2.72	11.1	
24	16 28.3	16 27.3	60 21.22	-0.170	60 17.40	-0.467	10 36.4	2.66	12.1	
25	16 25.2	16 22.3	60 10.01	-0.764	59 59.10	-1.051	11 38.3	2.49	13.1	
26	16 18.4	16 13.7	59 44.86	1.318	59 27.59	1.555	12 35.5	2.28	14.1	
27	16 8.3	16 2.2	59 7.68	1.756	58 45.62	1.914	13 27.6	2.08	15.1	
28	15 55.8	15 49.0	58 21.93	-2.027	57 57.16	-2.094	14 15.5	1.93	16.1	
29	15 42.2	15 35.2	57 31.85	2.116	57 6.54	2.095	15 0.5	1.83	17.1	
30	15 28.5	15 22.0	56 41.72	2.035	56 17.84	1.939	15 43.8	1.79	18.1	
31	15 15.8	15 10.2	55 55.30	1.813	55 34.43	1.661	16 26.7	1.80	19.1	
32	15 5.0	15 0.4	55 15.52	-1.488	54 58.79	-1.298	17 10.3	1.84	20.1	

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
THURSDAY 1.					SATURDAY 3.				
0	h m s	s	° ' "	"	0	h m s	s	° ' "	"
0	22 28 49.32	2.0158	S. 7 48 24.6	14.908	0	0 1 11.36	1.8669	N. 4 3 25.6	14.378
1	22 30 50.11	2.0106	7 33 29.7	14.922	1	0 3 3.34	1.8659	4 17 47.3	14.344
2	22 32 50.59	2.0054	7 18 34.0	14.934	2	0 4 55.27	1.8650	4 32 6.9	14.310
3	22 34 50.76	2.0004	7 3 37.6	14.945	3	0 6 47.14	1.8642	4 46 24.5	14.277
4	22 36 50.64	1.9955	6 48 40.6	14.956	4	0 8 38.97	1.8634	5 0 40.1	14.244
5	22 38 50.22	1.9906	6 33 42.9	14.965	5	0 10 30.75	1.8628	5 14 53.5	14.205
6	22 40 49.51	1.9858	6 18 44.8	14.973	6	0 12 22.50	1.8622	5 29 4.7	14.168
7	22 42 48.52	1.9812	6 3 46.2	14.979	7	0 14 14.21	1.8616	5 43 13.7	14.131
8	22 44 47.25	1.9766	5 48 47.3	14.985	8	0 16 5.89	1.8612	5 57 20.4	14.093
9	22 46 45.71	1.9721	5 33 48.0	14.990	9	0 17 57.55	1.8608	6 11 24.8	14.054
10	22 48 43.90	1.9677	5 18 48.5	14.993	10	0 19 49.19	1.8606	6 25 26.9	14.015
11	22 50 41.83	1.9634	5 3 48.9	14.994	11	0 21 40.82	1.8603	6 39 26.6	13.974
12	22 52 39.51	1.9593	4 48 49.2	14.995	12	0 23 32.43	1.8602	6 53 23.8	13.933
13	22 54 36.94	1.9551	4 33 49.5	14.995	13	0 25 24.04	1.8602	7 7 18.6	13.890
14	22 56 34.12	1.9510	4 18 49.8	14.994	14	0 27 15.65	1.8602	7 21 10.8	13.848
15	22 58 31.06	1.9471	4 3 50.2	14.992	15	0 29 7.26	1.8602	7 35 0.4	13.806
16	23 0 27.77	1.9433	3 48 50.8	14.988	16	0 30 58.87	1.8603	7 48 47.5	13.763
17	23 2 24.25	1.9395	3 33 51.7	14.983	17	0 32 50.50	1.8607	8 2 31.9	13.718
18	23 4 20.51	1.9359	3 18 52.9	14.978	18	0 34 42.15	1.8609	8 16 13.7	13.673
19	23 6 16.56	1.9323	3 3 54.4	14.972	19	0 36 33.81	1.8613	8 29 52.7	13.627
20	23 8 12.39	1.9288	2 48 56.3	14.964	20	0 38 25.50	1.8618	8 43 28.9	13.580
21	23 10 8.02	1.9254	2 33 58.7	14.955	21	0 40 17.22	1.8623	8 57 2.3	13.533
22	23 12 3.44	1.9221	2 19 1.7	14.945	22	0 42 8.97	1.8628	9 10 32.9	13.485
23	23 13 58.67	1.9189	S. 2 4 5.3	14.934	23	0 44 0.76	1.8636	N. 9 24 0.5	13.436
FRIDAY 2.					SUNDAY 4.				
0	23 15 53.71	1.9158	S. 1 49 9.6	14.923	0	0 45 52.60	1.8643	N. 9 37 25.2	13.387
1	23 17 48.57	1.9128	1 34 14.6	14.910	1	0 47 44.48	1.8651	9 50 46.9	13.337
2	23 19 43.25	1.9098	1 19 20.4	14.897	2	0 49 36.41	1.8659	10 4 5.6	13.287
3	23 21 37.75	1.9069	1 4 27.0	14.883	3	0 51 28.39	1.8668	10 17 21.3	13.235
4	23 23 32.08	1.9042	0 49 34.5	14.868	4	0 53 20.43	1.8679	10 30 33.8	13.183
5	23 25 26.25	1.9016	0 34 42.9	14.851	5	0 55 12.54	1.8690	10 43 43.2	13.130
6	23 27 20.27	1.8990	0 19 52.4	14.833	6	0 57 4.71	1.8701	10 56 49.4	13.077
7	23 29 14.13	1.8964	S. 0 5 2.9	14.815	7	0 58 56.95	1.8713	11 9 52.4	13.023
8	23 31 7.84	1.8940	N. 0 9 45.4	14.796	8	1 0 49.27	1.8726	11 22 52.2	12.968
9	23 33 1.41	1.8917	0 24 32.6	14.777	9	1 2 41.66	1.8739	11 35 48.6	12.913
10	23 34 54.84	1.8894	0 39 18.6	14.756	10	1 4 34.14	1.8753	11 48 41.7	12.857
11	23 36 48.14	1.8873	0 54 3.3	14.733	11	1 6 26.70	1.8768	12 1 31.4	12.800
12	23 38 41.32	1.8853	1 8 46.6	14.711	12	1 8 19.36	1.8784	12 14 17.7	12.743
13	23 40 34.37	1.8833	1 23 28.6	14.688	13	1 10 12.11	1.8799	12 27 0.5	12.684
14	23 42 27.31	1.8813	1 38 9.2	14.664	14	1 12 4.95	1.8816	12 39 39.8	12.626
15	23 44 20.13	1.8795	1 52 48.3	14.638	15	1 13 57.90	1.8833	12 52 15.6	12.566
16	23 46 12.85	1.8778	2 7 25.8	14.613	16	1 15 50.95	1.8851	13 4 47.7	12.505
17	23 48 5.47	1.8762	2 22 1.8	14.587	17	1 17 44.11	1.8869	13 17 16.2	12.443
18	23 49 57.99	1.8746	2 36 36.2	14.559	18	1 19 37.38	1.8888	13 29 41.1	12.384
19	23 51 50.42	1.8731	2 51 8.9	14.531	19	1 21 30.77	1.8908	13 42 2.3	12.322
20	23 53 42.76	1.8717	3 5 39.9	14.502	20	1 23 24.27	1.8928	13 54 19.7	12.258
21	23 55 35.02	1.8703	3 20 9.1	14.472	21	1 25 17.90	1.8949	14 6 33.3	12.195
22	23 57 27.20	1.8691	3 34 36.5	14.441	22	1 27 11.66	1.8970	14 18 43.1	12.132
23	23 59 19.31	1.8680	3 49 2.0	14.409	23	1 29 5.54	1.8992	14 30 49.1	12.067
24	0 1 11.36	1.8669	N. 4 3 25.6	14.378	24	1 30 59.56	1.9014	N. 14 42 51.1	12.000

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
MONDAY 5.					WEDNESDAY 7.				
0	h m s	s	° ' "	"	0	h m s	s	° ' "	"
1	1 30 59.56	1.9014	N. 14 42 51.1	12.000	1	3 5 41.33	2.0568	N. 22 50 4.7	8.025
2	1 32 53.71	1.9037	14 54 49.1	11.934	2	3 7 44.85	2.0605	22 58 3.2	7.925
3	1 34 48.00	1.9060	15 6 43.2	11.868	3	3 9 48.59	2.0643	23 5 55.7	7.824
4	1 36 42.43	1.9084	15 18 33.2	11.800	4	3 11 52.56	2.0681	23 13 42.1	7.722
5	1 38 37.01	1.9109	15 30 19.2	11.732	5	3 13 56.76	2.0719	23 21 22.3	7.619
6	1 40 31.74	1.9134	15 42 1.0	11.663	6	3 16 1.19	2.0758	23 28 56.4	7.516
7	1 42 26.62	1.9160	15 53 38.7	11.593	7	3 18 5.85	2.0795	23 36 24.2	7.412
8	1 44 21.66	1.9186	16 5 12.2	11.523	8	3 20 10.73	2.0833	23 43 45.8	7.307
9	1 46 16.85	1.9212	16 16 41.4	11.451	9	3 22 15.84	2.0871	23 51 1.0	7.201
10	1 48 12.20	1.9239	16 28 6.3	11.379	10	3 24 21.18	2.0908	23 58 9.9	7.095
11	1 50 7.72	1.9268	16 39 26.9	11.308	11	3 26 26.74	2.0946	24 5 12.4	6.988
12	1 52 3.41	1.9295	16 50 43.2	11.234	12	3 28 32.53	2.0983	24 12 8.5	6.882
13	1 53 59.26	1.9323	17 1 55.0	11.160	13	3 30 38.54	2.1020	24 18 58.1	6.773
14	1 55 55.28	1.9352	17 13 2.4	11.086	14	3 32 44.77	2.1058	24 25 41.2	6.663
15	1 57 51.48	1.9382	17 24 5.3	11.010	15	3 34 51.23	2.1095	24 32 17.7	6.553
16	1 59 47.86	1.9412	17 35 3.6	10.934	16	3 36 57.01	2.1132	24 38 47.6	6.443
17	2 1 44.42	1.9442	17 45 57.4	10.858	17	3 39 4.81	2.1168	24 45 10.8	6.331
18	2 3 41.16	1.9472	17 56 46.6	10.781	18	3 41 11.93	2.1204	24 51 27.3	6.219
19	2 5 38.08	1.9503	18 7 31.1	10.703	19	3 43 19.26	2.1240	24 57 37.1	6.108
20	2 7 35.19	1.9534	18 18 10.9	10.624	20	3 45 26.81	2.1277	25 3 40.2	5.994
21	2 9 32.49	1.9566	18 28 46.0	10.545	21	3 47 34.58	2.1313	25 9 36.4	5.880
22	2 11 29.98	1.9598	18 39 16.3	10.464	22	3 49 42.56	2.1348	25 15 25.8	5.766
23	2 13 27.67	1.9632	18 49 41.7	10.383	23	3 51 50.75	2.1383	25 21 8.3	5.651
24	2 15 25.56	1.9664	N. 19 0 2.3	10.302	24	3 53 59.15	2.1418	N. 25 26 43.9	5.534
TUESDAY 6.					THURSDAY 8.				
0	2 17 23.64	1.9697	N. 19 10 17.9	10.219	0	3 56 7.76	2.1453	N. 25 32 12.4	5.418
1	2 19 21.92	1.9731	19 20 28.6	10.137	1	3 58 16.58	2.1487	25 37 34.0	5.301
2	2 21 20.41	1.9765	19 30 34.3	10.053	2	4 0 25.60	2.1520	25 42 48.5	5.183
3	2 23 19.10	1.9798	19 40 34.9	9.968	3	4 2 34.82	2.1553	25 47 55.9	5.064
4	2 25 17.99	1.9833	19 50 30.4	9.883	4	4 4 44.24	2.1587	25 52 56.2	4.945
5	2 27 17.09	1.9868	20 0 20.8	9.797	5	4 6 53.86	2.1620	25 57 49.3	4.826
6	2 29 16.40	1.9903	20 10 6.0	9.710	6	4 9 3.68	2.1653	26 2 35.3	4.706
7	2 31 15.93	1.9938	20 19 46.0	9.623	7	4 11 13.69	2.1684	26 7 14.0	4.585
8	2 33 15.66	1.9973	20 29 20.7	9.534	8	4 13 23.89	2.1715	26 11 45.5	4.463
9	2 35 15.61	2.0010	20 38 50.1	9.446	9	4 15 34.27	2.1746	26 16 9.6	4.341
10	2 37 15.78	2.0046	20 48 14.2	9.357	10	4 17 44.84	2.1777	26 20 26.4	4.219
11	2 39 16.16	2.0082	20 57 32.9	9.266	11	4 19 55.59	2.1807	26 24 35.9	4.096
12	2 41 16.76	2.0118	21 6 46.1	9.175	12	4 22 6.52	2.1837	26 28 37.9	3.972
13	2 43 17.58	2.0155	21 15 53.9	9.083	13	4 24 17.63	2.1866	26 32 32.5	3.848
14	2 45 18.62	2.0192	21 24 56.1	8.991	14	4 26 28.91	2.1894	26 36 19.6	3.723
15	2 47 19.88	2.0228	21 33 52.8	8.898	15	4 28 40.36	2.1922	26 39 59.3	3.598
16	2 49 21.36	2.0266	21 42 43.8	8.803	16	4 30 51.97	2.1949	26 43 31.4	3.472
17	2 51 23.07	2.0303	21 51 29.2	8.709	17	4 33 3.75	2.1977	26 46 55.9	3.345
18	2 53 25.00	2.0340	22 0 8.9	8.613	18	4 35 15.69	2.2002	26 50 12.8	3.218
19	2 55 27.15	2.0378	22 8 42.8	8.518	19	4 37 27.78	2.2028	26 53 22.1	3.091
20	2 57 29.53	2.0416	22 17 11.0	8.421	20	4 39 40.02	2.2053	26 56 23.7	2.963
21	2 59 32.14	2.0454	22 25 33.3	8.323	21	4 41 52.41	2.2078	26 59 17.7	2.835
22	3 1 34.98	2.0492	22 33 49.7	8.224	22	4 44 4.95	2.2102	27 2 3.9	2.706
23	3 3 38.04	2.0529	22 42 0.2	8.125	23	4 46 17.63	2.2125	27 4 42.4	2.578
24	3 5 41.33	2.0568	N. 22 50 4.7	8.025	24	4 48 30.45	2.2148	N. 27 7 13.2	2.448

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.
FRIDAY 9.					SUNDAY 11.			
0	h m s	s	" ' "	"	0	h m s	s	" ' "
0	4 48 30.45	2.2148	N. 27 7 13.2	2.448	0	6 35 59.62	2.2337	N. 26 30 39.3
1	4 50 43.40	2.2169	27 9 36.2	2.318	1	6 38 13.60	2.2322	26 26 35.6
2	4 52 56.48	2.2190	27 11 51.3	2.187	2	6 40 27.48	2.2306	26 22 24.0
3	4 55 9.68	2.2211	27 13 58.6	2.057	3	6 42 41.27	2.2290	26 18 4.4
4	4 57 23.01	2.2231	27 15 58.1	1.926	4	6 44 54.96	2.2273	26 13 37.0
5	4 59 36.45	2.2250	27 17 49.7	1.793	5	6 47 8.51	2.2254	26 9 1.7
6	5 1 50.01	2.2268	27 19 33.3	1.661	6	6 49 22.01	2.2237	26 4 18.5
7	5 4 3.67	2.2286	27 21 9.0	1.529	7	6 51 35.38	2.2218	25 59 27.5
8	5 6 17.44	2.2303	27 22 36.8	1.398	8	6 53 48.63	2.2198	25 54 28.6
9	5 8 31.30	2.2318	27 23 56.7	1.265	9	6 56 1.76	2.2178	25 49 22.0
10	5 10 45.26	2.2335	27 25 8.6	1.132	10	6 58 14.76	2.2157	25 44 7.7
11	5 12 59.32	2.2350	27 26 12.5	0.998	11	7 0 27.64	2.2136	25 38 45.6
12	5 15 13.46	2.2363	27 27 8.3	0.863	12	7 2 40.39	2.2114	25 33 15.8
13	5 17 27.68	2.2377	27 27 56.1	0.730	13	7 4 53.01	2.2093	25 27 38.4
14	5 19 41.98	2.2389	27 28 35.9	0.596	14	7 7 5.49	2.2068	25 21 53.3
15	5 21 56.35	2.2400	27 29 7.6	0.462	15	7 9 17.83	2.2044	25 16 0.6
16	5 24 10.78	2.2411	27 29 31.3	0.328	16	7 11 30.02	2.2020	25 10 0.4
17	5 26 25.28	2.2422	27 29 46.9	0.193	17	7 13 42.07	2.1996	25 3 52.6
18	5 28 39.84	2.2431	27 29 54.4	+0.058	18	7 15 53.97	2.1971	24 57 37.3
19	5 30 54.45	2.2439	27 29 53.8	-0.078	19	7 18 5.72	2.1945	24 51 14.5
20	5 33 9.11	2.2447	27 29 45.1	0.213	20	7 20 17.31	2.1918	24 44 44.3
21	5 35 23.81	2.2453	27 29 28.2	0.349	21	7 22 28.74	2.1892	24 38 6.7
22	5 37 38.55	2.2460	27 29 3.2	0.484	22	7 24 40.01	2.1865	24 31 21.7
23	5 39 53.33	2.2465	N. 27 28 30.1	0.620	23	7 26 51.12	2.1838	N. 24 24 29.3
SATURDAY 10.					MONDAY 12.			
0	5 42 8.13	2.2469	N. 27 27 48.8	0.756	0	7 29 2.06	2.1810	N. 24 17 29.7
1	5 44 22.06	2.2473	27 26 59.4	0.892	1	7 31 12.84	2.1782	24 10 22.8
2	5 46 37.81	2.2476	27 26 1.8	1.028	2	7 33 23.44	2.1753	24 3 8.7
3	5 48 52.67	2.2478	27 24 56.1	1.163	3	7 35 33.87	2.1724	23 55 47.5
4	5 51 7.54	2.2479	27 23 42.3	1.298	4	7 37 44.13	2.1695	23 48 19.1
5	5 53 22.42	2.2480	27 22 20.3	1.435	5	7 39 54.21	2.1665	23 40 43.5
6	5 55 37.30	2.2479	27 20 50.1	1.571	6	7 42 4.11	2.1635	23 33 0.9
7	5 57 52.17	2.2478	27 19 11.8	1.707	7	7 44 13.83	2.1605	23 25 11.3
8	6 0 7.03	2.2476	27 17 25.3	1.843	8	7 46 23.37	2.1575	23 17 14.8
9	6 2 21.88	2.2473	27 15 30.7	1.978	9	7 48 32.73	2.1544	23 9 11.3
10	6 4 36.71	2.2470	27 13 27.9	2.114	10	7 50 41.90	2.1513	23 1 0.9
11	6 6 51.52	2.2465	27 11 17.0	2.249	11	7 52 50.88	2.1482	22 52 43.6
12	6 9 6.29	2.2459	27 8 58.0	2.384	12	7 54 59.68	2.1451	22 44 19.6
13	6 11 21.03	2.2453	27 6 30.9	2.520	13	7 57 8.29	2.1418	22 35 48.8
14	6 13 35.73	2.2447	27 3 55.6	2.656	14	7 59 16.70	2.1387	22 27 11.3
15	6 15 50.39	2.2439	27 1 12.2	2.790	15	8 1 24.93	2.1355	22 18 27.1
16	6 18 5.00	2.2431	26 58 20.8	2.925	16	8 3 32.96	2.1323	22 9 30.3
17	6 20 19.56	2.2422	26 55 21.2	3.060	17	8 5 40.80	2.1291	22 0 39.0
18	6 22 34.06	2.2412	26 52 13.6	3.193	18	8 7 48.45	2.1258	21 51 35.1
19	6 24 48.50	2.2401	26 48 58.0	3.328	19	8 9 55.90	2.1225	21 42 24.7
20	6 27 2.87	2.2390	26 45 34.3	3.463	20	8 12 3.15	2.1193	21 33 7.9
21	6 29 17.18	2.2378	26 42 2.5	3.596	21	8 14 10.21	2.1160	21 23 44.8
22	6 31 31.41	2.2365	26 38 22.8	3.729	22	8 16 17.07	2.1128	21 14 15.3
23	6 33 45.56	2.2351	26 34 35.0	3.863	23	8 18 23.74	2.1095	21 4 39.6
24	6 35 59.62	2.2337	N. 26 30 39.3	3.995	24	8 20 30.21	2.1062	N. 20 54 57.6

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

our.	Right Ascension.			Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.			Diff. for 1 Min.	Declination.	Diff. for 1 Min.		
TUESDAY 13.							THURSDAY 15.								
0	h	m	s	s	"	"	0	h	m	s	s	"	"		
0	8	20	30.21	2.1062	N. 20	54 57.6	9.751	0	9	58	7.07	1.9729	N. 11	24 34.6	13.661
1	8	22	36.48	2.1029	20 45	9.5	9.853	1	10	0	5.39	1.9712	11 10	53.2	13.718
2	8	24	42.56	2.0997	20 35	15.2	9.956	2	10	2	3.61	1.9695	10 57	8.4	13.776
3	8	26	48.44	2.0963	20 25	14.8	10.057	3	10	4	1.73	1.9678	10 43	20.1	13.833
4	8	28	54.12	2.0931	20 15	8.4	10.157	4	10	5	59.75	1.9661	10 29	28.5	13.888
5	8	30	59.61	2.0898	20 4	56.0	10.256	5	10	7	57.67	1.9646	10 15	33.6	13.943
6	8	33	4.90	2.0866	19 54	37.7	10.354	6	10	9	55.50	1.9632	10 1	35.4	13.997
7	8	35	10.00	2.0833	19 44	13.5	10.452	7	10	11	53.25	1.9618	9 47	34.0	14.049
8	8	37	14.90	2.0801	19 33	43.5	10.548	8	10	13	50.91	1.9603	9 33	29.5	14.101
9	8	39	19.61	2.0769	19 23	7.8	10.643	9	10	15	48.49	1.9590	9 19	21.9	14.152
10	8	41	24.13	2.0737	19 12	26.3	10.739	10	10	17	45.99	1.9573	9 5	11.3	14.201
11	8	43	28.45	2.0704	19 1	39.1	10.833	11	10	19	43.42	1.9566	8 50	57.8	14.249
12	8	45	32.58	2.0673	18 50	46.4	10.925	12	10	21	40.78	1.9555	8 36	41.4	14.298
13	8	47	36.52	2.0641	18 39	48.1	11.018	13	10	23	38.08	1.9544	8 22	22.1	14.344
14	8	49	40.27	2.0609	18 28	44.3	11.109	14	10	25	35.31	1.9534	8 8	0.1	14.390
15	8	51	43.83	2.0578	18 17	35.0	11.200	15	10	27	32.49	1.9525	7 53	35.3	14.435
16	8	53	47.20	2.0547	18 6	20.3	11.289	16	10	29	29.61	1.9516	7 39	7.9	14.478
17	8	55	50.39	2.0516	17 55	0.3	11.378	17	10	31	26.68	1.9508	7 24	37.9	14.522
18	8	57	53.39	2.0485	17 43	35.0	11.466	18	10	33	23.71	1.9502	7 10	5.3	14.564
19	8	59	56.21	2.0455	17 32	4.4	11.553	19	10	35	20.70	1.9495	6 55	30.2	14.605
20	9	1	58.85	2.0425	17 20	28.7	11.638	20	10	37	17.65	1.9489	6 40	52.7	14.644
21	9	4	1.31	2.0395	17 8	47.9	11.723	21	10	39	14.57	1.9483	6 26	12.9	14.683
22	9	6	3.59	2.0365	16 57	2.0	11.807	22	10	41	11.45	1.9478	6 11	30.8	14.721
23	9	8	5.69	2.0335	N. 16	45 11.1	11.889	23	10	43	8.31	1.9476	N. 5	56 46.4	14.758
WEDNESDAY 14.							FRIDAY 16.								
0	h	m	s	s	"	"	0	h	m	s	s	"	"		
0	9	10	7.61	2.0306	N. 16	33 15.3	11.971	0	10	45	5.16	1.9473	N. 5	41 59.9	14.793
1	9	12	9.36	2.0278	16 21	14.6	12.053	1	10	47	1.99	1.9471	5 27	11.2	14.828
2	9	14	10.94	2.0249	16 9	9.0	12.133	2	10	48	58.81	1.9469	5 12	20.5	14.862
3	9	16	12.35	2.0221	15 56	58.6	12.213	3	10	50	55.62	1.9468	4 57	27.8	14.895
4	9	18	13.59	2.0193	15 44	43.4	12.292	4	10	52	52.43	1.9468	4 42	33.1	14.928
5	9	20	14.67	2.0166	15 32	23.6	12.368	5	10	54	49.24	1.9468	4 27	36.5	14.958
6	9	22	15.58	2.0138	15 19	59.2	12.444	6	10	56	46.05	1.9470	4 12	38.1	14.988
7	9	24	16.33	2.0113	15 7	30.3	12.520	7	10	58	42.88	1.9473	3 57	38.0	15.017
8	9	26	16.93	2.0087	14 54	56.8	12.596	8	11	0	39.73	1.9476	3 42	36.1	15.045
9	9	28	17.37	2.0060	14 42	18.8	12.669	9	11	2	36.59	1.9479	3 27	32.6	15.072
10	9	30	17.65	2.0034	14 29	36.5	12.742	10	11	4	33.48	1.9484	3 12	27.5	15.098
11	9	32	17.78	2.0010	14 16	49.8	12.813	11	11	6	30.40	1.9489	2 57	20.9	15.123
12	9	34	17.77	1.9986	14 3	58.9	12.884	12	11	8	27.35	1.9495	2 42	12.8	15.146
13	9	36	17.61	1.9961	13 51	3.7	12.954	13	11	10	24.34	1.9503	2 27	3.4	15.168
14	9	38	17.30	1.9938	13 38	4.4	13.023	14	11	12	21.38	1.9510	2 11	52.6	15.190
15	9	40	16.86	1.9915	13 25	1.0	13.091	15	11	14	18.46	1.9518	1 56	40.6	15.211
16	9	42	16.28	1.9893	13 11	53.5	13.158	16	11	16	15.60	1.9528	1 41	27.3	15.231
17	9	44	15.57	1.9870	12 58	42.0	13.224	17	11	18	12.79	1.9538	1 26	12.9	15.249
18	9	46	14.72	1.9848	12 45	26.6	13.289	18	11	20	10.05	1.9548	1 10	57.4	15.267
19	9	48	13.75	1.9828	12 32	7.3	13.353	19	11	22	7.37	1.9560	0 55	40.9	15.283
20	9	50	12.65	1.9807	12 18	44.2	13.417	20	11	24	4.77	1.9573	0 40	23.5	15.298
21	9	52	11.43	1.9787	12 5	17.3	13.479	21	11	26	2.25	1.9587	0 25	5.2	15.313
22	9	54	10.09	1.9768	11 51	46.7	13.540	22	11	27	59.81	1.9600	N. 0	9 46.0	15.326
23	9	56	8.64	1.9748	11 38	12.5	13.601	23	11	29	57.45	1.9615	S. 0	5 33.9	15.338
24	9	58	7.07	1.9729	N. 11	24 34.6	13.661	24	11	31	55.19	1.9632	S. 0	20 54.5	15.348

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
SATURDAY 17.					MONDAY 19.				
0	h m s	s	° ' "	"	0	h m s	s	° ' "	"
0	11 31 55.19	1.9632	S. 0 20 54.5	15.348	0	13 9 36.45	2.1406	S. 12 27 58.3	14.456
1	11 33 53.03	1.9648	0 36 15.7	15.358	1	13 11 45.06	2.1464	12 42 24.1	14.403
2	11 35 50.97	1.9665	0 51 37.5	15.367	2	13 13 54.02	2.1523	12 56 46.7	14.350
3	11 37 49.01	1.9683	1 6 59.7	15.374	3	13 16 3.34	2.1583	13 11 6.1	14.295
4	11 39 47.17	1.9703	1 22 22.4	15.382	4	13 18 13.02	2.1643	13 25 22.1	14.238
5	11 41 45.44	1.9723	1 37 45.5	15.387	5	13 20 23.06	2.1704	13 39 34.7	14.180
6	11 43 43.84	1.9744	1 53 8.8	15.391	6	13 22 33.47	2.1767	13 53 43.7	14.120
7	11 45 42.37	1.9766	2 8 32.4	15.394	7	13 24 44.26	2.1830	14 7 49.1	14.059
8	11 47 41.03	1.9788	2 23 56.1	15.396	8	13 26 55.43	2.1893	14 21 50.8	13.996
9	11 49 39.83	1.9812	2 39 19.9	15.398	9	13 29 6.68	2.1958	14 35 48.6	13.931
10	11 51 38.77	1.9836	2 54 43.8	15.398	10	13 31 18.92	2.2023	14 49 42.5	13.865
11	11 53 37.86	1.9861	3 10 7.6	15.396	11	13 33 31.25	2.2088	15 3 32.4	13.798
12	11 55 37.10	1.9887	3 25 31.3	15.393	12	13 35 43.97	2.2153	15 17 18.2	13.728
13	11 57 36.50	1.9914	3 40 54.8	15.389	13	13 37 57.09	2.2221	15 30 59.8	13.657
14	11 59 36.07	1.9942	3 56 18.0	15.384	14	13 40 10.62	2.2289	15 44 37.0	13.583
15	12 1 35.80	1.9970	4 11 40.9	15.378	15	13 42 24.56	2.2358	15 58 9.8	13.509
16	12 3 35.71	2.0000	4 27 3.4	15.371	16	13 44 38.91	2.2426	16 11 38.1	13.433
17	12 5 35.80	2.0030	4 42 25.4	15.363	17	13 46 53.67	2.2496	16 25 1.7	13.354
18	12 7 36.07	2.0062	4 57 46.9	15.353	18	13 49 8.86	2.2567	16 38 20.6	13.275
19	12 9 36.54	2.0094	5 13 7.7	15.342	19	13 51 24.47	2.2637	16 51 34.7	13.194
20	12 11 37.20	2.0127	5 28 27.9	15.330	20	13 53 40.50	2.2708	17 4 43.9	13.111
21	12 13 38.06	2.0161	5 43 47.3	15.317	21	13 55 56.97	2.2781	17 17 48.0	13.025
22	12 15 39.13	2.0196	5 59 5.9	15.303	22	13 58 13.87	2.2853	17 30 46.9	12.938
23	12 17 40.41	2.0232	S. 6 14 23.6	15.287	23	14 0 31.20	2.2926	S. 17 43 40.6	12.850
SUNDAY 18.					TUESDAY 20.				
0	12 19 41.91	2.0268	S. 6 29 40.3	15.269	0	14 2 48.98	2.3000	S. 17 56 28.9	12.759
1	12 21 43.63	2.0305	6 44 55.9	15.251	1	14 5 7.20	2.3073	18 9 11.7	12.668
2	12 23 45.57	2.0343	7 0 10.4	15.232	2	14 7 25.86	2.3148	18 21 49.0	12.574
3	12 25 47.75	2.0383	7 15 23.7	15.210	3	14 9 44.97	2.3223	18 34 20.6	12.478
4	12 27 50.16	2.0423	7 30 35.6	15.188	4	14 12 4.54	2.3299	18 46 46.4	12.381
5	12 29 52.82	2.0463	7 45 46.2	15.164	5	14 14 24.56	2.3374	18 59 6.3	12.282
6	12 31 55.72	2.0505	8 0 55.3	15.139	6	14 16 45.03	2.3450	19 11 20.2	12.180
7	12 33 58.88	2.0548	8 16 2.9	15.113	7	14 19 5.96	2.3527	19 23 27.9	12.077
8	12 36 2.30	2.0592	8 31 8.9	15.086	8	14 21 27.35	2.3604	19 35 29.4	11.973
9	12 38 5.98	2.0636	8 46 13.2	15.057	9	14 23 49.21	2.3682	19 47 24.6	11.866
10	12 40 9.93	2.0682	9 1 15.7	15.027	10	14 26 11.53	2.3758	19 59 13.3	11.758
11	12 42 14.16	2.0728	9 16 16.4	14.996	11	14 28 34.31	2.3836	20 10 55.5	11.647
12	12 44 18.67	2.0775	9 31 15.2	14.963	12	14 30 57.56	2.3914	20 22 30.9	11.534
13	12 46 23.46	2.0823	9 46 11.9	14.928	13	14 33 21.28	2.3993	20 33 59.6	11.420
14	12 48 28.54	2.0872	10 1 6.5	14.893	14	14 35 45.47	2.4071	20 45 21.3	11.303
15	12 50 33.92	2.0922	10 15 59.0	14.855	15	14 38 10.13	2.4149	20 56 36.0	11.186
16	12 52 39.60	2.0972	10 30 49.1	14.816	16	14 40 35.26	2.4228	21 7 43.6	11.066
17	12 54 45.58	2.1023	10 45 36.9	14.777	17	14 43 0.86	2.4306	21 18 43.9	10.944
18	12 56 51.87	2.1075	11 0 22.3	14.736	18	14 45 26.93	2.4384	21 29 36.9	10.821
19	12 58 58.48	2.1128	11 15 5.2	14.693	19	14 47 53.47	2.4463	21 40 22.4	10.695
20	13 1 5.41	2.1183	11 29 45.4	14.648	20	14 50 20.49	2.4543	21 51 0.3	10.567
21	13 3 12.67	2.1238	11 44 22.9	14.602	21	14 52 47.98	2.4620	22 1 30.4	10.438
22	13 5 20.26	2.1293	11 58 57.6	14.554	22	14 55 15.93	2.4698	22 11 52.8	10.307
23	13 7 28.19	2.1349	12 13 29.4	14.506	23	14 57 44.36	2.4777	22 22 7.2	10.173
24	13 9 36.45	2.1406	S. 12 27 58.3	14.456	24	15 0 13.25	2.4855	S. 22 32 13.6	10.038

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
WEDNESDAY 21.					FRIDAY 23.				
0	h m s	s	° ' "	"	0	h m s	s	° ' "	"
0	15 0 13.25	2.4855	S. 22 32 13.6	10.038	0	17 7 13.40	2.7604	S. 27 25 33.1	1.688
1	15 2 42.62	2.4933	22 42 11.8	9.902	1	17 9 59.09	2.7625	27 27 4.7	1.424
2	15 5 12.45	2.5011	22 52 1.8	9.763	2	17 12 44.90	2.7643	27 28 24.0	1.219
3	15 7 42.75	2.5088	23 1 43.3	9.622	3	17 15 30.81	2.7659	27 29 31.0	1.014
4	15 10 13.51	2.5165	23 11 16.4	9.479	4	17 18 16.81	2.7673	27 30 25.7	0.810
5	15 12 44.73	2.5242	23 20 40.8	9.334	5	17 21 2.89	2.7686	27 31 8.2	0.605
6	15 15 16.41	2.5318	23 29 56.5	9.188	6	17 23 49.04	2.7696	27 31 38.3	0.398
7	15 17 48.55	2.5394	23 39 3.4	9.040	7	17 26 35.24	2.7704	27 31 56.0	-0.193
8	15 20 21.14	2.5470	23 48 1.3	8.890	8	17 29 21.49	2.7711	27 32 1.4	+0.013
9	15 22 54.19	2.5545	23 56 50.2	8.738	9	17 32 7.77	2.7714	27 31 54.5	0.218
10	15 25 27.68	2.5618	24 5 29.9	8.584	10	17 34 54.06	2.7716	27 31 35.2	0.425
11	15 28 1.61	2.5692	24 14 0.3	8.429	11	17 37 40.36	2.7716	27 31 3.5	0.632
12	15 30 35.98	2.5765	24 22 21.4	8.272	12	17 40 26.65	2.7713	27 30 19.4	0.838
13	15 33 10.79	2.5838	24 30 32.9	8.113	13	17 43 12.92	2.7709	27 29 23.0	1.043
14	15 35 46.03	2.5909	24 38 34.9	7.953	14	17 45 59.16	2.7703	27 28 14.2	1.250
15	15 38 21.70	2.5980	24 46 27.2	7.790	15	17 48 45.36	2.7694	27 26 53.0	1.456
16	15 40 57.79	2.6049	24 54 9.7	7.625	16	17 51 31.49	2.7683	27 25 19.5	1.661
17	15 43 34.29	2.6118	25 1 42.2	7.459	17	17 54 17.55	2.7670	27 23 33.7	1.866
18	15 46 11.21	2.6187	25 9 4.8	7.293	18	17 57 3.53	2.7655	27 21 35.6	2.071
19	15 48 48.53	2.6253	25 16 17.3	7.123	19	17 59 49.41	2.7638	27 19 25.2	2.275
20	15 51 26.25	2.6320	25 23 19.5	6.953	20	18 2 35.10	2.7620	27 17 2.6	2.478
21	15 54 4.37	2.6386	25 30 11.5	6.780	21	18 5 20.85	2.7598	27 14 27.8	2.682
22	15 56 42.88	2.6449	25 36 53.1	6.606	22	18 8 6.37	2.7575	27 11 40.8	2.884
23	15 59 21.76	2.6512	S. 25 43 24.2	6.430	23	18 10 51.75	2.7551	S. 27 8 41.7	3.087
THURSDAY 22.					SATURDAY 24.				
0	h m s	s	° ' "	"	0	h m s	s	° ' "	"
0	16 2 1.02	2.6574	S. 25 49 44.7	6.253	0	18 13 36.98	2.7523	S. 27 5 30.4	3.288
1	16 4 40.65	2.6635	25 55 54.5	6.074	1	18 16 22.03	2.7494	27 2 7.1	3.489
2	16 7 20.64	2.6694	26 1 53.6	5.894	2	18 19 6.91	2.7464	26 58 31.7	3.690
3	16 10 0.98	2.6752	26 7 41.8	5.712	3	18 21 51.60	2.7431	26 54 44.3	3.888
4	16 12 41.66	2.6808	26 13 19.0	5.529	4	18 24 36.08	2.7396	26 50 45.1	4.086
5	16 15 22.68	2.6864	26 18 45.3	5.345	5	18 27 20.35	2.7359	26 46 34.0	4.283
6	16 18 4.03	2.6918	26 24 0.4	5.158	6	18 30 4.39	2.7321	26 42 11.1	4.480
7	16 20 45.70	2.6970	26 29 4.3	4.978	7	18 32 48.20	2.7282	26 37 36.4	4.675
8	16 23 27.67	2.7021	26 33 57.0	4.783	8	18 35 31.77	2.7240	26 32 50.1	4.868
9	16 26 9.95	2.7071	26 38 38.3	4.593	9	18 38 15.08	2.7196	26 27 52.2	5.062
10	16 28 52.52	2.7118	26 43 8.2	4.403	10	18 40 58.12	2.7150	26 22 42.7	5.254
11	16 31 35.37	2.7164	26 47 26.7	4.212	11	18 43 40.88	2.7103	26 17 21.7	5.444
12	16 34 18.49	2.7209	26 51 33.6	4.018	12	18 46 23.36	2.7053	26 11 49.4	5.633
13	16 37 1.88	2.7253	26 55 28.8	3.823	13	18 49 5.54	2.7004	26 6 5.7	5.822
14	16 39 45.52	2.7293	26 59 12.4	3.628	14	18 51 47.41	2.6953	26 0 10.8	6.008
15	16 42 29.40	2.7333	27 2 44.2	3.432	15	18 54 28.97	2.6900	25 54 4.8	6.193
16	16 45 13.51	2.7370	27 6 4.2	3.235	16	18 57 10.21	2.6845	25 47 47.6	6.378
17	16 47 57.84	2.7406	27 9 12.4	3.037	17	18 59 51.11	2.6788	25 41 19.5	6.559
18	16 50 42.38	2.7440	27 12 8.6	2.838	18	19 2 31.67	2.6731	25 34 40.5	6.740
19	16 53 27.12	2.7473	27 14 52.9	2.638	19	19 5 11.88	2.6672	25 27 50.7	6.919
20	16 56 12.05	2.7503	27 17 25.1	2.437	20	19 7 51.73	2.6612	25 20 50.2	7.098
21	16 58 57.15	2.7531	27 19 45.3	2.236	21	19 10 31.22	2.6551	25 13 39.0	7.274
22	17 1 42.42	2.7558	27 21 53.4	2.034	22	19 13 10.34	2.6488	25 6 17.3	7.448
23	17 4 27.84	2.7582	27 23 49.4	1.831	23	19 15 49.07	2.6423	24 58 45.2	7.622
24	17 7 13.40	2.7604	S. 27 25 33.1	1.628	24	19 18 27.42	2.6358	S. 24 51 2.7	7.793

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
SUNDAY 25.					TUESDAY 27.				
0	h m s	s	"	"	0	h m s	s	"	"
0	19 18 27.42	2.6358	S. 24 51 2.7	7.793	0	21 16 16.55	2.2668	S. 15 56 5.6	13.719
1	19 21 5.37	2.6292	24 43 10.0	7.963	1	21 18 32.33	2.2593	15 42 20.2	13.793
2	19 23 42.92	2.6225	24 35 7.2	8.130	2	21 20 47.67	2.2520	15 28 30.5	13.864
3	19 26 20.07	2.6157	24 26 54.4	8.297	3	21 23 2.57	2.2447	15 14 36.5	13.935
4	19 28 56.80	2.6087	24 18 31.6	8.461	4	21 25 17.03	2.2373	15 0 38.3	14.003
5	19 31 33.11	2.6017	24 9 59.1	8.623	5	21 27 31.05	2.2301	14 46 36.1	14.069
6	19 34 9.00	2.5946	24 1 16.8	8.784	6	21 29 44.64	2.2229	14 32 30.0	14.133
7	19 36 44.46	2.5874	23 52 25.0	8.943	7	21 31 57.80	2.2158	14 18 20.1	14.196
8	19 39 19.49	2.5802	23 43 23.7	9.099	8	21 34 10.54	2.2088	14 4 6.5	14.257
9	19 41 54.08	2.5728	23 34 13.1	9.254	9	21 36 22.85	2.2018	13 49 49.3	14.316
10	19 44 28.22	2.5653	23 24 53.2	9.408	10	21 38 34.75	2.1948	13 35 28.6	14.373
11	19 47 1.92	2.5578	23 15 24.1	9.559	11	21 40 46.23	2.1880	13 21 4.5	14.428
12	19 49 35.16	2.5502	23 5 46.1	9.708	12	21 42 57.31	2.1813	13 6 37.2	14.481
13	19 52 7.94	2.5426	22 55 59.2	9.855	13	21 45 7.98	2.1745	12 52 6.8	14.533
14	19 54 40.27	2.5350	22 46 3.5	10.001	14	21 47 18.25	2.1679	12 37 33.3	14.583
15	19 57 12.14	2.5273	22 35 59.1	10.144	15	21 49 28.13	2.1613	12 22 56.9	14.631
16	19 59 43.54	2.5194	22 25 46.2	10.285	16	21 51 37.61	2.1548	12 8 17.6	14.678
17	20 2 14.47	2.5116	22 15 24.9	10.424	17	21 53 46.70	2.1483	11 53 35.6	14.722
18	20 4 44.93	2.5038	22 4 55.3	10.561	18	21 55 55.41	2.1420	11 38 51.0	14.764
19	20 7 14.92	2.4958	21 54 17.6	10.696	19	21 58 3.74	2.1358	11 24 3.9	14.806
20	20 9 44.43	2.4879	21 43 31.8	10.830	20	22 0 11.70	2.1296	11 9 14.3	14.846
21	20 12 13.47	2.4800	21 32 38.0	10.961	21	22 2 19.29	2.1234	10 54 22.4	14.883
22	20 14 42.03	2.4720	21 21 36.5	11.089	22	22 4 26.51	2.1173	10 39 28.3	14.919
23	20 17 10.11	2.4640	S. 21 10 27.3	11.217	23	22 6 33.37	2.1114	S. 10 24 32.1	14.954
MONDAY 26.					WEDNESDAY 28.				
0	h m s	s	"	"	0	h m s	s	"	"
0	20 19 37.71	2.4560	S. 20 59 10.5	11.342	0	22 8 39.88	2.1055	S. 10 9 33.8	14.988
1	20 22 4.83	2.4479	20 47 46.3	11.464	1	22 10 46.03	2.0997	9 54 33.6	15.019
2	20 24 31.46	2.4399	20 36 14.8	11.585	2	22 12 51.84	2.0940	9 39 31.5	15.049
3	20 26 57.62	2.4319	20 24 36.1	11.703	3	22 14 57.31	2.0883	9 24 27.7	15.077
4	20 29 23.29	2.4238	20 12 50.4	11.819	4	22 17 2.44	2.0828	9 9 22.3	15.105
5	20 31 48.48	2.4158	20 0 57.8	11.934	5	22 19 7.24	2.0773	8 54 15.3	15.139
6	20 34 13.19	2.4078	19 48 58.3	12.047	6	22 21 11.71	2.0718	8 39 6.8	15.163
7	20 36 37.41	2.3997	19 36 52.2	12.157	7	22 23 15.86	2.0666	8 23 56.9	15.176
8	20 39 1.15	2.3917	19 24 39.5	12.265	8	22 25 19.70	2.0613	8 8 45.7	15.196
9	20 41 24.41	2.3837	19 12 20.4	12.371	9	22 27 23.22	2.0561	7 53 33.4	15.215
10	20 43 47.19	2.3757	18 59 55.0	12.475	10	22 29 26.43	2.0510	7 38 19.9	15.233
11	20 46 9.49	2.3678	18 47 23.4	12.578	11	22 31 29.34	2.0461	7 23 5.4	15.249
12	20 48 31.32	2.3598	18 34 45.7	12.678	12	22 33 31.06	2.0412	7 7 50.0	15.264
13	20 50 52.66	2.3518	18 22 2.1	12.775	13	22 35 34.28	2.0363	6 52 33.7	15.278
14	20 53 13.53	2.3439	18 9 12.7	12.871	14	22 37 36.32	2.0316	6 37 16.7	15.289
15	20 55 33.93	2.3361	17 56 17.6	12.965	15	22 39 38.07	2.0269	6 21 59.0	15.301
16	20 57 53.86	2.3283	17 43 16.0	13.057	16	22 41 39.55	2.0223	5 6 40.6	15.311
17	21 0 13.32	2.3204	17 30 10.8	13.146	17	22 43 40.75	2.0178	5 51 21.7	15.318
18	21 2 32.31	2.3126	17 16 59.4	13.234	18	22 45 41.69	2.0135	5 36 2.4	15.324
19	21 4 50.83	2.3048	17 3 42.7	13.320	19	22 47 42.37	2.0092	5 20 42.8	15.330
20	21 7 8.89	2.2972	16 50 21.0	13.403	20	22 49 42.79	2.0049	5 5 22.8	15.335
21	21 9 26.49	2.2895	16 36 54.3	13.485	21	22 51 42.96	2.0008	4 50 2.6	15.338
22	21 11 43.63	2.2819	16 23 22.8	13.565	22	22 53 42.89	1.9968	4 34 42.3	15.339
23	21 14 0.32	2.2743	16 9 40.5	13.643	23	22 55 42.57	1.9928	4 19 21.9	15.339
24	21 16 16.55	2.2668	S. 15 56 5.6	13.719	24	22 57 42.02	1.9889	S. 4 4 1.6	15.338

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
THURSDAY 29.					SATURDAY 31.				
	<i>h m s</i>	<i>s</i>	<i>° ' "</i>	<i>"</i>		<i>h m s</i>	<i>s</i>	<i>° ' "</i>	<i>"</i>
0	22 57 42.02	1.9889	S. 4 4 1.6	15.338	0	0 30 15.46	1.8983	N. 7 50 26.4	14.063
1	22 59 41.24	1.9851	3 48 41.4	15.336	1	0 32 9.36	1.8983	8 4 28.7	14.014
2	23 1 40.23	1.9813	3 33 21.3	15.333	2	0 34 3.26	1.8984	8 18 28.1	13.965
3	23 3 39.00	1.9777	3 18 1.4	15.328	3	0 35 57.17	1.8985	8 32 24.5	13.915
4	23 5 37.55	1.9741	3 2 41.9	15.323	4	0 37 51.08	1.8987	8 46 17.9	13.865
5	23 7 35.89	1.9707	2 47 22.7	15.316	5	0 39 45.01	1.8990	9 0 8.3	13.813
6	23 9 34.03	1.9673	2 32 4.0	15.308	6	0 41 38.96	1.8993	9 13 55.5	13.761
7	23 11 31.97	1.9640	2 16 45.8	15.298	7	0 43 32.93	1.8998	9 27 39.6	13.708
8	23 13 29.71	1.9608	2 1 28.2	15.288	8	0 45 26.93	1.9003	9 41 20.5	13.654
9	23 15 27.26	1.9577	1 46 11.3	15.276	9	0 47 20.96	1.9008	9 54 58.1	13.600
10	23 17 24.63	1.9546	1 30 55.1	15.263	10	0 49 15.03	1.9014	10 8 32.5	13.545
11	23 19 21.81	1.9516	1 15 39.7	15.249	11	0 51 9.13	1.9021	10 22 3.5	13.489
12	23 21 18.82	1.9488	1 0 25.2	15.234	12	0 53 3.28	1.9029	10 35 31.2	13.433
13	23 23 15.66	1.9460	0 45 11.6	15.219	13	0 54 57.48	1.9037	10 48 55.5	13.376
14	23 25 12.34	1.9433	0 29 58.9	15.203	14	0 56 51.72	1.9045	11 2 16.3	13.318
15	23 27 8.85	1.9406	S. 0 14 47.3	15.183	15	0 58 46.02	1.9055	11 15 33.6	13.258
16	23 29 5.21	1.9381	N. 0 0 23.1	15.164	16	1 0 40.38	1.9065	11 28 47.3	13.199
17	23 31 1.42	1.9356	0 15 32.4	15.145	17	1 2 34.80	1.9076	11 41 57.5	13.139
18	23 32 57.48	1.9332	0 30 40.5	15.124	18	1 4 29.29	1.9087	11 55 4.0	13.078
19	23 34 53.40	1.9309	0 45 47.3	15.102	19	1 6 23.84	1.9098	12 8 6.9	13.017
20	23 36 49.19	1.9288	1 0 52.7	15.078	20	1 8 18.47	1.9112	12 21 6.0	12.954
21	23 38 44.85	1.9266	1 15 56.7	15.055	21	1 10 13.18	1.9124	12 34 1.4	12.892
22	23 40 40.38	1.9245	1 30 59.3	15.030	22	1 12 7.96	1.9138	12 46 53.0	12.828
23	23 42 35.79	1.9225	N. 1 46 0.3	15.003	23	1 14 2.83	1.9153	N. 12 59 40.8	12.763
FRIDAY 30.					SUNDAY, AUGUST 1.				
0	23 44 31.08	1.9206	N. 2 0 59.7	14.977	0	1 15 57.79	1.9168	N. 13 12 24.6	12.698
1	23 46 26.26	1.9188	2 15 57.5	14.948					
2	23 48 21.34	1.9171	2 30 53.5	14.919					
3	23 50 16.31	1.9154	2 45 47.8	14.889					
4	23 52 11.19	1.9138	3 0 40.2	14.858					
5	23 54 5.97	1.9123	3 15 30.8	14.828					
6	23 56 0.67	1.9109	3 30 19.5	14.795					
7	23 57 55.28	1.9095	3 45 6.2	14.761					
8	23 59 49.81	1.9083	3 59 50.8	14.727					
9	0 1 44.27	1.9071	4 14 33.4	14.692					
10	0 3 38.66	1.9060	4 29 13.8	14.655					
11	0 5 32.99	1.9050	4 43 52.0	14.618					
12	0 7 27.26	1.9040	4 58 28.0	14.581					
13	0 9 21.47	1.9031	5 13 1.7	14.542					
14	0 11 15.63	1.9023	5 27 33.0	14.502					
15	0 13 9.75	1.9017	5 42 1.9	14.462					
16	0 15 3.83	1.9010	5 56 28.4	14.421					
17	0 16 57.87	1.9003	6 10 52.4	14.379					
18	0 18 51.87	1.8998	6 25 13.9	14.336					
19	0 20 45.85	1.8994	6 39 32.7	14.292					
20	0 22 39.80	1.8990	6 53 48.9	14.248					
21	0 24 33.73	1.8988	7 8 2.4	14.203					
22	0 26 27.65	1.8986	7 22 13.2	14.157					
23	0 28 21.56	1.8984	7 36 21.2	14.110					
24	0 30 15.46	1.8983	N. 7 50 26.4	14.063					

PHASES OF THE MOON.

☾ Last Quarter July 3 17 54.2

● New Moon 11 21 30.8

☾ First Quarter 19 9 8.8

○ Full Moon 26 0 11.0

☾ Apogee July 7 22.8

☾ Perigee 23 17.4

AT GREENWICH APPARENT NOON.

Day of the Week.	Day of the Month.	THE SUN'S					Sidereal Time of Semidiameter Passing Meridian.	Equation of Time, to be Added to Apparent Time.	
		Apparent Right Ascension.	Diff. for 1 Hour.	Apparent Declination.	Diff. for 1 Hour.	Semidiameter.			
		h m s	s	" ' "	"	" "	s	m s	
SUN.	1	8 42 16.66	9.728	N. 18 14 20.9	-37.14	15 47.36	66.68	6 12.48	
Mon.	2	8 46 9.85	9.704	17 59 20.7	37.88	15 47.48	66.59	6 9.12	
Tues.	3	8 50 2.45	9.680	17 44 2.7	38.61	15 47.60	66.51	6 5.18	
Wed.	4	8 53 54.47	9.655	17 28 27.4	-39.33	15 47.72	66.42	6 0.65	
Thur.	5	8 57 45.90	9.631	17 12 34.9	40.04	15 47.85	66.33	5 55.54	
Fri.	6	9 1 36.74	9.606	16 56 25.6	40.73	15 47.99	66.24	5 49.84	
Sat.	7	9 5 26.99	9.582	16 39 59.7	-41.41	15 48.13	66.15	5 43.55	
SUN.	8	9 9 16.66	9.557	16 23 17.7	42.08	15 48.27	66.07	5 36.68	
Mon.	9	9 13 5.75	9.533	16 6 19.7	42.74	15 48.42	65.98	5 29.24	
Tues.	10	9 16 54.25	9.509	15 49 6.2	-43.38	15 48.57	65.90	5 21.21	
Wed.	11	9 20 42.18	9.485	15 31 37.4	44.01	15 48.72	65.81	5 12.60	
Thur.	12	9 24 29.53	9.461	15 13 53.7	44.62	15 48.88	65.73	5 3.43	
Fri.	13	9 28 16.31	9.437	14 55 55.4	-45.22	15 49.05	65.65	4 53.68	
Sat.	14	9 32 2.53	9.414	14 37 42.9	45.81	15 49.23	65.57	4 43.37	
SUN.	15	9 35 48.18	9.391	14 19 16.5	46.38	15 49.41	65.49	4 32.49	
Mon.	16	9 39 33.28	9.368	14 0 36.6	-46.94	15 49.59	65.42	4 21.07	
Tues.	17	9 43 17.83	9.345	13 41 43.3	47.49	15 49.78	65.34	4 9.09	
Wed.	18	9 47 1.84	9.323	13 22 37.2	48.02	15 49.97	65.27	3 56.58	
Thur.	19	9 50 45.32	9.301	13 3 18.4	-48.54	15 50.16	65.19	3 43.54	
Fri.	20	9 54 28.28	9.280	12 43 47.4	49.04	15 50.35	65.12	3 29.99	
Sat.	21	9 58 10.75	9.259	12 24 4.4	49.54	15 50.55	65.05	3 15.94	
SUN.	22	10 1 52.72	9.239	12 4 9.7	-50.02	15 50.75	64.99	3 1.40	
Mon.	23	10 5 34.22	9.220	11 44 3.6	50.49	15 50.95	64.92	2 46.39	
Tues.	24	10 9 15.28	9.201	11 23 46.4	50.94	15 51.15	64.86	2 30.93	
Wed.	25	10 12 55.89	9.183	11 3 18.4	-51.39	15 51.36	64.79	2 15.03	
Thur.	26	10 16 36.09	9.166	10 42 39.9	51.82	15 51.57	64.73	1 58.71	
Fri.	27	10 20 15.88	9.150	10 21 51.2	52.24	15 51.78	64.67	1 42.00	
Sat.	28	10 23 55.29	9.135	10 0 52.4	-52.65	15 51.99	64.61	1 24.90	
SUN.	29	10 27 34.34	9.120	9 39 44.1	53.04	15 52.20	64.55	1 7.45	
Mon.	30	10 31 13.05	9.106	9 18 26.4	53.42	15 52.41	64.50	0 49.65	
Tues.	31	10 34 51.42	9.092	8 56 59.7	53.79	15 52.63	64.45	0 31.52	
Wed.	32	10 38 29.48	9.079	N. 8 35 24.3	-54.15	15 52.85	64.40	0 13.07	

NOTE.—The mean time of semidiameter passing the meridian may be found by subtracting 0^s.19 from the time.

The sign — prefixed to the hourly change of declination indicates that north declinations are decreasing.

AT GREENWICH MEAN NOON.

Day of the Month.	THE SUN'S				Equation of Time, to be Subtracted from Mean Time.	Diff. for 1 Hour.	Sidereal Time, or Right Ascension of Mean Sun.
	Apparent Right Ascension.	Diff. for 1 Hour.	Apparent Declination.	Diff. for 1 Hour.			
	h m s	s	° ' "	"	m s	s	h m s
1	8 42 15.65	9.729	N. 18 14 24.8	-37.14	6 12.49	0.127	8 36 31.16
2	8 46 8.85	9.705	17 59 24.6	37.88	6 9.14	0.152	8 39 59.72
3	8 50 1.47	9.680	17 44 6.6	38.61	6 5.20	0.176	8 43 56.27
4	8 53 53.50	9.656	17 28 31.3	-39.33	6 0.67	0.201	8 47 52.83
5	8 57 44.94	9.631	17 12 38.8	40.04	5 55.56	0.225	8 51 49.38
6	9 1 35.80	9.607	16 56 29.5	40.73	5 49.86	0.250	8 55 45.94
7	9 5 26.07	9.583	16 40 3.7	-41.41	5 43.58	0.274	8 59 42.50
8	9 9 15.76	9.558	16 23 21.6	42.08	5 36.71	0.298	9 3 39.05
9	9 13 4.87	9.534	16 6 23.6	42.74	5 29.27	0.322	9 7 35.61
10	9 16 53.40	9.510	15 49 10.0	-43.38	5 21.24	0.346	9 11 32.16
11	9 20 41.35	9.486	15 31 41.2	44.01	5 12.63	0.370	9 15 28.72
12	9 24 28.74	9.462	15 13 57.5	44.63	5 3.46	0.394	9 19 25.28
13	9 28 15.54	9.439	14 55 59.1	-45.23	4 53.71	0.418	9 23 21.83
14	9 32 1.79	9.415	14 37 46.5	45.81	4 43.40	0.441	9 27 18.39
15	9 35 47.47	9.392	14 19 20.0	46.38	4 32.53	0.465	9 31 14.94
16	9 39 32.60	9.369	14 0 40.0	-46.94	4 21.10	0.488	9 35 11.50
17	9 43 17.18	9.346	13 41 46.6	47.49	4 9.13	0.510	9 39 8.05
18	9 47 1.22	9.324	13 22 40.3	48.02	3 56.62	0.532	9 43 4.61
19	9 50 44.74	9.302	13 3 21.4	-48.54	3 43.58	0.554	9 47 1.16
20	9 54 27.74	9.281	12 43 50.3	49.05	3 30.02	0.575	9 50 57.72
21	9 58 10.24	9.261	12 24 7.1	49.54	3 15.97	0.596	9 54 54.27
22	10 1 52.25	9.241	12 4 12.2	-50.02	3 1.43	0.616	9 58 50.83
23	10 5 33.80	9.222	11 44 6.0	50.49	2 46.42	0.635	10 2 47.38
24	10 9 14.89	9.204	11 23 48.6	50.95	2 30.95	0.653	10 6 43.94
25	10 12 55.54	9.187	11 3 20.4	-51.40	2 15.05	0.671	10 10 40.49
26	10 16 35.78	9.169	10 42 41.6	51.83	1 58.74	0.688	10 14 37.05
27	10 20 15.62	9.152	10 21 52.6	52.24	1 42.02	0.704	10 18 33.60
28	10 23 55.08	9.136	10 0 53.7	-52.64	1 24.92	0.720	10 22 30.16
29	10 27 34.17	9.122	9 39 45.1	53.04	1 7.46	0.735	10 26 26.71
30	10 31 12.92	9.108	9 18 27.1	53.43	0 49.66	0.749	10 30 23.26
31	10 34 51.34	9.094	8 57 0.2	53.80	0 31.52	0.762	10 34 19.82
32	10 38 29.45	9.081	N. 8 35 24.5	-54.16	0 13.08	0.775	10 38 16.37

g.—The semidiameter for mean noon may be assumed the same as that for apparent noon.
 The sign — prefixed to the hourly change of declination indicates that north declinations are decreasing.

Diff. for 1 Hour,
 +9°.8565.
 (Table III.)

AT GREENWICH MEAN NOON.

Day of the Month.	Day of the Year.	THE SUN'S						Logarithm of the Radius Vector of the Earth.	Diff. for 1 Hour.	Mean Time of Sidereal Noon.		
		True Longitude.		Diff. for 1 Hour.	Latitude.							
		λ	λ'									
		$^{\circ}$	$'$	$''$	$^{\circ}$	$'$	$''$			h	m	s
1	213	128	8	57.6	8	15.9	143.50	+0.58	0.006 4325	-22.0	15	21 25.47
2	214	129	6	22.0	5	40.2	143.54	0.63	0.006 3789	22.7	15	17 29.56
3	215	130	3	47.6	3	5.6	143.59	0.65	0.006 3236	23.5	15	13 33.65
4	216	131	1	14.4	0	32.2	143.64	+0.65	0.006 2663	-24.3	15	9 37.74
5	217	131	58	42.4	58	0.0	143.69	0.61	0.006 2071	25.1	15	5 41.83
6	218	132	56	11.5	55	29.1	143.74	0.55	0.006 1459	26.0	15	1 45.92
7	219	133	53	42.0	52	59.3	143.79	+0.46	0.006 0825	-26.9	14	57 50.01
8	220	134	51	13.6	50	30.8	143.84	0.35	0.006 0170	27.8	14	53 54.10
9	221	135	48	46.4	48	3.5	143.89	0.23	0.005 9493	28.7	14	49 58.19
10	222	136	46	20.4	45	37.4	143.94	+0.09	0.005 8793	-29.6	14	46 2.28
11	223	137	43	55.6	43	12.4	143.99	-0.05	0.005 8070	30.6	14	42 6.37
12	224	138	41	31.9	40	48.6	144.04	0.19	0.005 7325	31.5	14	38 10.46
13	225	139	39	9.3	38	25.9	144.08	-0.31	0.005 6557	-32.4	14	34 14.55
14	226	140	36	47.8	36	4.2	144.12	0.41	0.005 5768	33.3	14	30 18.64
15	227	141	34	27.3	33	43.5	144.17	0.50	0.005 4958	34.1	14	26 22.73
16	228	142	32	7.8	31	23.9	144.21	-0.55	0.005 4129	-34.9	14	22 26.82
17	229	143	29	49.3	29	5.3	144.25	0.57	0.005 3281	35.7	14	18 30.92
18	230	144	27	31.8	26	47.7	144.29	0.56	0.005 2417	36.4	14	14 35.01
19	231	145	25	15.4	24	31.1	144.34	-0.51	0.005 1538	-36.9	14	10 39.10
20	232	146	23	0.1	22	15.6	144.39	0.43	0.005 0647	37.4	14	6 43.19
21	233	147	20	45.8	20	1.3	144.44	0.33	0.004 9743	37.8	14	2 47.28
22	234	148	18	32.8	17	48.1	144.49	-0.21	0.004 8830	-38.2	13	58 51.37
23	235	149	16	21.0	15	36.2	144.54	-0.07	0.004 7908	38.6	13	54 55.46
24	236	150	14	10.6	13	25.7	144.60	+0.07	0.004 6977	38.9	13	50 59.55
25	237	151	12	1.7	11	16.6	144.66	+0.20	0.004 6040	-39.2	13	47 3.64
26	238	152	9	54.3	9	9.1	144.73	0.32	0.004 5094	39.6	13	43 7.73
27	239	153	7	48.5	7	3.2	144.80	0.42	0.004 4141	39.9	13	39 11.83
28	240	154	5	44.4	4	59.0	144.87	+0.49	0.004 3179	-40.2	13	35 15.92
29	241	155	3	42.2	2	56.6	144.94	0.54	0.004 2209	40.6	13	31 20.01
30	242	156	1	41.7	0	56.0	145.02	0.57	0.004 1230	41.0	13	27 24.10
31	243	156	59	43.1	58	57.3	145.10	0.58	0.004 0240	41.5	13	23 28.19
32	244	157	57	46.4	57	0.5	145.18	+0.55	0.003 9239	-42.0	13	19 32.28

NOTE.—The longitudes in the column λ are referred to the true equinox of their own date, while those in the column λ' are referred to the mean equinox of the beginning of the Besselian fictitious year.

Diff. for 1 Hour,
—9^h.8296.
(Table II.)

GREENWICH MEAN TIME.

Day of the Month.	THE MOON'S								
	SEMI- DIAMETER.		HORIZONTAL PARALLAX.				UPPER TRANSIT.		AGE.
	Noon.	Midnight.	Noon.	Diff. for 1 Hour.	Midnight.	Diff. for 1 Hour.	Meridian of Greenwich.	Diff. for 1 Hour.	Noon.
	' "	' "	' "	"	' "	"	h m	m	d
1	15 5.0	15 0.4	55 15.52	-1.488	54 58.79	-1.208	17 10.3	1.84	20.1
2	14 56.5	14 53.3	54 44.41	1.098	54 32.48	0.890	17 55.3	1.91	21.1
3	14 50.7	14 48.8	54 23.08	0.676	54 16.26	0.461	18 42.4	2.01	22.1
4	14 47.7	14 47.2	54 12.00	-0.250	54 10.24	-0.045	19 31.7	2.09	23.1
5	14 47.4	14 48.2	54 10.89	+0.152	54 13.86	+0.340	20 22.6	2.15	24.1
6	14 49.6	14 51.6	54 19.01	0.515	54 26.17	0.676	21 14.4	2.16	25.1
7	14 54.0	14 56.9	54 35.17	+0.821	54 45.81	+0.949	22 5.8	2.12	26.1
8	15 0.2	15 3.8	54 57.87	1.058	55 11.12	1.147	22 55.9	2.05	27.1
9	15 7.7	15 11.7	55 25.33	1.218	55 40.27	1.269	23 44.2	1.98	28.1
10	15 16.0	15 20.2	55 55.72	+1.303	56 11.48	+1.321	0	.	29.1
11	15 24.6	15 28.9	56 27.35	1.322	56 43.14	1.308	0 30.7	1.91	0.5
12	15 33.1	15 37.2	56 58.70	1.283	57 13.90	1.248	1 16.0	1.88	1.5
13	15 41.3	15 45.1	57 28.63	+1.205	57 42.80	+1.157	2 0.9	1.88	2.5
14	15 48.8	15 52.4	57 56.38	1.106	58 9.32	1.050	2 46.4	1.92	3.5
15	15 55.7	15 58.8	58 21.58	0.992	58 33.13	0.933	3 33.8	2.03	4.5
16	16 1.8	16 4.5	58 43.95	+0.869	58 53.97	+0.800	4 24.4	2.19	5.5
17	16 7.0	16 9.2	59 3.12	0.724	59 11.31	0.639	5 18.9	2.37	6.5
18	16 11.2	16 12.8	59 18.42	0.544	59 24.32	0.437	6 17.8	2.53	7.5
19	16 14.0	16 14.8	59 28.85	+0.315	59 31.81	+0.176	7 19.9	2.62	8.5
20	16 15.2	16 15.0	59 33.03	+0.025	59 32.35	-0.141	8 23.1	2.60	9.5
21	16 14.2	16 12.9	59 29.60	-0.320	59 24.63	0.509	9 24.6	2.50	10.5
22	16 10.9	16 8.3	59 17.37	-0.700	59 7.83	-0.890	10 22.5	2.32	11.5
23	16 5.1	16 1.3	58 56.03	1.075	58 42.08	1.248	11 15.9	2.14	12.5
24	15 57.0	15 52.1	58 26.16	1.402	58 8.53	1.532	12 5.3	1.98	13.5
25	15 47.0	15 41.5	57 49.50	-1.636	57 29.39	-1.711	12 51.6	1.88	14.5
26	15 35.8	15 30.1	57 8.58	1.751	56 47.50	1.757	13 36.0	1.82	15.5
27	15 24.4	15 18.8	56 26.54	1.731	56 6.08	1.674	14 19.6	1.82	16.5
28	15 13.4	15 8.4	55 46.49	-1.587	55 28.11	-1.472	15 3.5	1.85	17.5
29	15 3.8	14 59.8	55 11.27	1.331	54 56.25	1.170	15 48.5	1.90	18.5
30	14 56.2	14 53.3	54 43.26	0.992	54 32.50	0.799	16 35.2	1.98	19.5
31	14 51.0	14 49.4	54 24.13	0.594	54 18.27	-0.381	17 23.8	2.06	20.5
2	14 48.5	14 48.3	54 14.99	-0.165	54 14.30	+0.050	18 14.1	2.12	21.5

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 M.
SUNDAY 1.					TUESDAY 3.				
0	h m s	s	" "	" "	0	h m s	s	" "	" "
1	1 15 57.79	1.9168	N. 13 12 24.6	12.698	1	2 50 37.73	2.0428	N. 21 53 59.6	8
2	1 17 52.84	1.9183	13 25 4.5	12.633	2	2 52 40.40	2.0462	22 2 43.1	8
3	1 19 47.98	1.9198	13 37 40.5	12.566	3	2 54 43.27	2.0496	22 11 20.7	8
4	1 21 43.22	1.9216	13 50 12.4	12.498	4	2 56 46.35	2.0530	22 19 52.3	8
5	1 23 38.57	1.9233	14 2 40.3	12.431	5	2 58 49.63	2.0564	22 28 17.9	8
6	1 25 34.02	1.9250	14 15 4.1	12.363	6	3 0 53.12	2.0599	22 36 37.5	8
7	1 27 29.57	1.9268	14 27 23.8	12.293	7	3 2 56.82	2.0633	22 44 51.0	8
8	1 29 25.24	1.9288	14 39 39.3	12.223	8	3 5 0.72	2.0668	22 52 58.3	8
9	1 31 21.02	1.9307	14 51 50.6	12.153	9	3 7 4.83	2.0703	23 0 59.5	7
10	1 33 16.92	1.9327	15 3 57.6	12.082	10	3 9 9.15	2.0738	23 8 54.5	7
11	1 35 12.94	1.9348	15 16 0.4	12.010	11	3 11 13.68	2.0772	23 16 43.3	7
12	1 37 9.09	1.9368	15 27 58.8	11.937	12	3 13 18.41	2.0806	23 24 25.8	7
13	1 39 5.36	1.9389	15 39 52.8	11.863	13	3 15 23.35	2.0841	23 32 2.0	7
14	1 41 1.76	1.9412	15 51 42.4	11.790	14	3 17 28.50	2.0876	23 39 31.8	7
15	1 42 58.30	1.9434	16 3 27.6	11.716	15	3 19 33.86	2.0911	23 46 55.2	7
16	1 44 54.97	1.9457	16 15 8.3	11.640	16	3 21 39.43	2.0945	23 54 12.2	7
17	1 46 51.78	1.9481	16 26 44.4	11.563	17	3 23 45.20	2.0979	24 1 22.7	7
18	1 48 48.74	1.9505	16 38 15.9	11.487	18	3 25 51.18	2.1014	24 8 26.7	7
19	1 50 45.84	1.9528	16 49 42.8	11.410	19	3 27 57.37	2.1048	24 15 24.1	6
20	1 52 43.08	1.9553	17 1 5.1	11.333	20	3 30 3.76	2.1083	24 22 15.0	6
21	1 54 40.48	1.9579	17 12 22.7	11.253	21	3 32 10.36	2.1118	24 28 59.2	6
22	1 56 38.03	1.9604	17 23 35.5	11.173	22	3 34 17.17	2.1152	24 35 36.8	6
23	1 58 35.73	1.9630	17 34 43.5	11.093	23	3 36 24.18	2.1185	24 42 7.7	6
24	2 0 33.59	1.9658	N. 17 45 46.7	11.013	24	3 38 31.39	2.1218	N. 24 48 31.8	6
MONDAY 2.					WEDNESDAY 4.				
0	2 2 31.62	1.9684	N. 17 56 45.0	10.931	0	3 40 38.80	2.1253	N. 24 54 49.1	6
1	2 4 20.80	1.9711	18 7 38.4	10.849	1	3 42 46.42	2.1286	25 0 59.6	6
2	2 6 28.15	1.9739	18 18 26.9	10.767	2	3 44 54.23	2.1319	25 7 3.3	6
3	2 8 26.67	1.9768	18 29 10.4	10.683	3	3 47 2.25	2.1353	25 13 0.1	5
4	2 10 25.36	1.9796	18 39 48.8	10.598	4	3 49 10.46	2.1385	25 18 49.9	5
5	2 12 24.22	1.9824	18 50 22.2	10.514	5	3 51 18.87	2.1418	25 24 32.8	5
6	2 14 23.25	1.9853	19 0 50.5	10.428	6	3 53 27.47	2.1449	25 30 8.7	5
7	2 16 22.46	1.9883	19 11 13.6	10.343	7	3 55 36.26	2.1482	25 35 37.5	5
8	2 18 21.85	1.9913	19 21 31.6	10.256	8	3 57 45.25	2.1514	25 40 59.3	5
9	2 20 21.42	1.9943	19 31 44.3	10.168	9	3 59 54.43	2.1546	25 46 14.0	5
10	2 22 21.17	1.9973	19 41 51.8	10.080	10	4 2 3.80	2.1577	25 51 21.5	5
11	2 24 21.10	2.0004	19 51 53.9	9.991	11	4 4 13.35	2.1608	25 56 21.9	4
12	2 26 21.22	2.0036	20 1 50.7	9.902	12	4 6 23.09	2.1638	26 1 15.0	4
13	2 28 21.53	2.0068	20 11 42.1	9.811	13	4 8 33.01	2.1668	26 6 0.9	4
14	2 30 22.03	2.0099	20 21 28.0	9.720	14	4 10 43.11	2.1698	26 10 39.6	4
15	2 32 22.72	2.0131	20 31 8.5	9.628	15	4 12 53.39	2.1728	26 15 10.9	4
16	2 34 23.60	2.0163	20 40 43.4	9.536	16	4 15 3.84	2.1757	26 19 34.9	4
17	2 36 24.67	2.0195	20 50 12.8	9.443	17	4 17 14.47	2.1786	26 23 51.5	4
18	2 38 25.94	2.0228	20 59 36.6	9.350	18	4 19 25.27	2.1814	26 28 0.7	4
19	2 40 27.41	2.0261	21 8 54.8	9.256	19	4 21 36.24	2.1842	26 32 2.5	3
20	2 42 29.07	2.0293	21 18 7.3	9.161	20	4 23 47.37	2.1869	26 35 56.9	3
21	2 44 30.93	2.0328	21 27 14.1	9.065	21	4 25 58.67	2.1897	26 39 43.7	3
22	2 46 33.00	2.0362	21 36 15.1	8.968	22	4 28 10.13	2.1923	26 43 23.0	3
23	2 48 35.27	2.0394	21 45 10.3	8.871	23	4 30 21.74	2.1948	26 46 54.8	2
24	2 50 37.73	2.0428	N. 21 53 59.6	8.773	24	4 32 33.51	2.1974	N. 26 50 19.0	2

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
THURSDAY 5.					SATURDAY 7.				
0	4 32 33.51	2.1974	N. 26 50 19.0	3.340	0	6 19 48.22	2.2445	N. 26 58 31.2	3.067
1	4 34 45.43	2.1999	26 53 35.6	3.213	1	6 22 2.87	2.2438	26 55 23.2	3.202
2	4 36 57.50	2.2023	26 56 44.5	3.085	2	6 24 17.47	2.2429	26 52 7.0	3.338
3	4 39 9.71	2.2047	26 59 45.8	2.958	3	6 26 32.02	2.2420	26 48 42.7	3.472
4	4 41 22.06	2.2071	27 2 39.4	2.839	4	6 28 46.51	2.2411	26 45 10.4	3.606
5	4 43 34.56	2.2094	27 5 25.3	2.701	5	6 31 0.95	2.2401	26 41 30.0	3.740
6	4 45 47.19	2.2116	27 8 3.5	2.572	6	6 33 15.32	2.2389	26 37 41.6	3.873
7	4 47 59.95	2.2138	27 10 33.9	2.442	7	6 35 29.62	2.2378	26 33 45.2	4.008
8	4 50 12.84	2.2159	27 12 56.5	2.312	8	6 37 43.85	2.2365	26 29 40.7	4.142
9	4 52 25.86	2.2180	27 15 11.3	2.182	9	6 39 58.00	2.2353	26 25 28.2	4.274
10	4 54 39.00	2.2199	27 17 18.3	2.051	10	6 42 12.08	2.2339	26 21 7.8	4.407
11	4 56 52.25	2.2218	27 19 17.4	1.919	11	6 44 26.07	2.2324	26 16 39.4	4.540
12	4 59 5.62	2.2238	27 21 8.6	1.788	12	6 46 39.97	2.2309	26 12 3.0	4.673
13	5 1 19.10	2.2255	27 22 52.0	1.657	13	6 48 53.78	2.2294	26 7 18.7	4.804
14	5 3 32.68	2.2273	27 24 27.4	1.524	14	6 51 7.50	2.2278	26 2 26.5	4.936
15	5 5 46.37	2.2290	27 25 54.9	1.392	15	6 53 21.12	2.2261	25 57 26.4	5.067
16	5 8 0.16	2.2306	27 27 14.4	1.259	16	6 55 34.63	2.2243	25 52 18.5	5.198
17	5 10 14.04	2.2322	27 28 26.0	1.127	17	6 57 48.04	2.2226	25 47 2.7	5.328
18	5 12 28.02	2.2337	27 29 29.6	0.993	18	7 0 1.34	2.2208	25 41 39.1	5.458
19	5 14 42.08	2.2350	27 30 25.2	0.859	19	7 2 14.53	2.2188	25 36 7.7	5.588
20	5 16 56.22	2.2363	27 31 12.7	0.725	20	7 4 27.60	2.2168	25 30 28.6	5.717
21	5 19 10.44	2.2377	27 31 52.2	0.592	21	7 6 40.55	2.2148	25 24 41.7	5.846
22	5 21 24.74	2.2388	27 32 23.7	0.458	22	7 8 53.38	2.2128	25 18 47.1	5.974
23	5 23 39.10	2.2399	N. 27 32 47.2	0.323	23	7 11 6.09	2.2107	N. 25 12 44.8	6.103
FRIDAY 6.					SUNDAY 8.				
0	5 25 53.53	2.2410	N. 27 33 2.5	0.188	0	7 13 18.66	2.2085	N. 25 6 34.8	6.230
1	5 28 8.02	2.2420	27 33 9.8	+0.053	1	7 15 31.11	2.2063	25 0 17.2	6.357
2	5 30 22.57	2.2429	27 33 8.9	-0.082	2	7 17 43.42	2.2041	24 53 52.0	6.483
3	5 32 37.17	2.2438	27 33 0.0	0.217	3	7 19 55.60	2.2018	24 47 19.3	6.608
4	5 34 51.82	2.2446	27 32 42.9	0.353	4	7 22 7.64	2.1994	24 40 39.0	6.734
5	5 37 6.52	2.2453	27 32 17.7	0.488	5	7 24 19.53	2.1970	24 33 51.2	6.858
6	5 39 21.25	2.2458	27 31 44.4	0.623	6	7 26 31.28	2.1947	24 26 56.0	6.983
7	5 41 36.02	2.2464	27 31 2.9	0.759	7	7 28 42.89	2.1923	24 19 53.3	7.107
8	5 43 50.82	2.2468	27 30 13.3	0.894	8	7 30 54.35	2.1897	24 12 43.2	7.230
9	5 46 5.64	2.2473	27 29 15.6	1.030	9	7 33 5.65	2.1871	24 5 25.7	7.353
10	5 48 20.49	2.2477	27 28 9.7	1.166	10	7 35 16.80	2.1846	23 58 0.9	7.474
11	5 50 35.36	2.2479	27 26 55.7	1.302	11	7 37 27.80	2.1820	23 50 28.8	7.595
12	5 52 50.24	2.2481	27 25 33.5	1.438	12	7 39 38.64	2.1793	23 42 49.5	7.715
13	5 55 5.13	2.2482	27 24 3.1	1.574	13	7 41 49.32	2.1767	23 35 3.0	7.835
14	5 57 20.02	2.2482	27 22 24.6	1.710	14	7 43 59.84	2.1739	23 27 9.3	7.955
15	5 59 34.91	2.2482	27 20 37.9	1.846	15	7 46 10.19	2.1712	23 19 8.4	8.074
16	6 1 49.80	2.2481	27 18 43.1	1.982	16	7 48 20.38	2.1684	23 11 0.4	8.192
17	6 4 4.68	2.2479	27 16 40.1	2.118	17	7 50 30.40	2.1656	23 2 45.4	8.308
18	6 6 19.55	2.2477	27 14 29.0	2.253	18	7 52 40.25	2.1628	22 54 23.4	8.425
19	6 8 34.40	2.2473	27 12 9.7	2.389	19	7 54 49.94	2.1601	22 45 54.4	8.541
20	6 10 49.22	2.2468	27 9 42.3	2.525	20	7 56 59.46	2.1572	22 37 18.5	8.656
21	6 13 4.02	2.2464	27 7 6.7	2.661	21	7 59 8.80	2.1543	22 28 35.7	8.771
22	6 15 18.79	2.2459	27 4 23.0	2.796	22	8 1 17.97	2.1514	22 19 46.0	8.885
23	6 17 33.53	2.2453	27 1 31.2	2.932	23	8 3 26.97	2.1485	22 10 49.5	8.998
24	6 19 48.22	2.2445	N. 26 58 31.2	3.067	24	8 5 35.79	2.1456	N. 22 1 46.3	9.110

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.
MONDAY 9.					WEDNESDAY 11.			
0	h m s	s	"	"	0	h m s	s	"
0	8 5 35.79	2.1456	N. 22 1 46.3	9.110	0	9 45 15.62	2.0142	N. 12 51 14.9
1	8 7 44.44	2.1427	21 52 36.3	9.322	1	9 47 16.41	2.0122	12 37 44.4
2	8 9 52.91	2.1397	21 43 19.7	9.332	2	9 49 17.08	2.0102	12 24 9.9
3	8 12 1.20	2.1367	21 33 56.5	9.442	3	9 51 17.63	2.0082	12 10 31.4
4	8 14 9.31	2.1338	21 24 26.7	9.551	4	9 53 18.06	2.0063	11 56 49.1
5	8 16 17.25	2.1308	21 14 50.4	9.659	5	9 55 18.38	2.0044	11 43 2.9
6	8 18 25.00	2.1278	21 5 7.6	9.768	6	9 57 18.59	2.0027	11 29 13.0
7	8 20 32.58	2.1248	20 55 18.3	9.874	7	9 59 18.70	2.0009	11 15 19.4
8	8 22 39.98	2.1218	20 45 22.7	9.979	8	10 1 18.70	1.9992	11 1 22.1
9	8 24 47.20	2.1188	20 35 20.8	10.085	9	10 3 18.60	1.9975	10 47 21.2
10	8 26 54.24	2.1158	20 25 12.5	10.190	10	10 5 18.40	1.9959	10 33 16.8
11	8 29 1.10	2.1128	20 14 58.0	10.293	11	10 7 18.11	1.9943	10 19 9.0
12	8 31 7.77	2.1098	20 4 37.4	10.395	12	10 9 17.72	1.9928	10 4 57.9
13	8 33 14.27	2.1068	19 54 10.6	10.497	13	10 11 17.25	1.9914	9 50 43.4
14	8 35 20.59	2.1038	19 43 37.8	10.598	14	10 13 16.69	1.9900	9 36 25.7
15	8 37 26.73	2.1008	19 32 58.9	10.698	15	10 15 16.05	1.9888	9 22 4.8
16	8 39 32.69	2.0978	19 22 14.0	10.798	16	10 17 15.34	1.9875	9 7 40.7
17	8 41 38.47	2.0949	19 11 23.2	10.895	17	10 19 14.55	1.9863	8 53 13.6
18	8 43 44.08	2.0920	19 0 26.6	10.993	18	10 21 13.69	1.9851	8 38 43.5
19	8 45 49.51	2.0890	18 49 24.1	11.090	19	10 23 12.76	1.9840	8 24 10.5
20	8 47 54.76	2.0861	18 38 15.8	11.185	20	10 25 11.77	1.9830	8 9 34.6
21	8 49 59.84	2.0832	18 27 1.9	11.279	21	10 27 10.72	1.9820	7 54 55.9
22	8 52 4.74	2.0803	18 15 42.3	11.373	22	10 29 9.61	1.9811	7 40 14.5
23	8 54 9.47	2.0774	N. 18 4 17.1	11.466	23	10 31 8.45	1.9803	N. 7 25 30.5
TUESDAY 10.					THURSDAY 12.			
0	h m s	s	"	"	0	h m s	s	"
0	8 56 14.03	2.0746	N. 17 52 46.4	11.558	0	10 33 7.24	1.9795	N. 7 10 43.8
1	8 58 18.42	2.0717	17 41 10.2	11.649	1	10 35 5.99	1.9788	6 55 54.6
2	9 0 22.63	2.0688	17 29 28.5	11.739	2	10 37 4.69	1.9781	6 41 3.0
3	9 2 26.68	2.0661	17 17 41.5	11.828	3	10 39 3.36	1.9775	6 26 8.9
4	9 4 30.56	2.0633	17 5 49.2	11.916	4	10 41 1.99	1.9769	6 11 12.5
5	9 6 34.27	2.0605	16 53 51.6	12.003	5	10 43 0.59	1.9764	5 56 13.9
6	9 8 37.82	2.0578	16 41 48.8	12.089	6	10 44 59.16	1.9761	5 41 13.0
7	9 10 41.21	2.0551	16 29 40.9	12.175	7	10 46 57.72	1.9758	5 26 10.0
8	9 12 44.43	2.0524	16 17 27.8	12.260	8	10 48 56.25	1.9754	5 11 5.0
9	9 14 47.50	2.0498	16 5 9.7	12.343	9	10 50 54.77	1.9753	4 55 58.0
10	9 16 50.41	2.0472	15 52 46.7	12.425	10	10 52 53.29	1.9753	4 40 49.0
11	9 18 53.16	2.0445	15 40 18.7	12.507	11	10 54 51.80	1.9751	4 25 38.2
12	9 20 55.75	2.0419	15 27 45.9	12.587	12	10 56 50.30	1.9751	4 10 25.6
13	9 22 58.19	2.0394	15 15 8.3	12.667	13	10 58 48.81	1.9753	3 55 11.3
14	9 25 0.48	2.0370	15 2 25.9	12.745	14	11 0 47.33	1.9753	3 39 55.3
15	9 27 2.63	2.0346	14 49 38.9	12.823	15	11 2 45.85	1.9755	3 24 37.7
16	9 29 4.63	2.0321	14 36 47.2	12.899	16	11 4 44.39	1.9758	3 9 18.6
17	9 31 6.48	2.0297	14 23 51.0	12.974	17	11 6 42.95	1.9762	2 53 58.1
18	9 33 8.19	2.0273	14 10 50.3	13.049	18	11 8 41.53	1.9767	2 38 36.2
19	9 35 9.76	2.0251	13 57 45.1	13.123	19	11 10 40.15	1.9773	2 23 13.0
20	9 37 11.20	2.0228	13 44 35.6	13.195	20	11 12 38.80	1.9778	2 7 48.5
21	9 39 12.50	2.0206	13 31 21.7	13.267	21	11 14 37.48	1.9783	1 52 22.9
22	9 41 13.67	2.0184	13 18 3.6	13.337	22	11 16 36.20	1.9791	1 36 56.2
23	9 43 14.71	2.0163	13 4 41.3	13.406	23	11 18 34.97	1.9799	1 21 28.5
24	9 45 15.62	2.0142	N. 12 51 14.9	13.474	24	11 20 33.79	1.9808	N. 1 5 59.8

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
FRIDAY 13.					SUNDAY 15.				
0	11 20 33.79	1.9808	N. 1 5 59.8	15.485	0	12 58 6.63	2.1138	S. 11 11 16.8	14.731
1	11 22 32.67	1.9818	0 50 30.3	15.499	1	13 0 13.60	2.1185	11 25 59.2	14.682
2	11 24 31.60	1.9828	0 34 59.9	15.513	2	13 2 20.85	2.1232	11 40 38.6	14.631
3	11 26 30.60	1.9838	0 19 28.8	15.524	3	13 4 28.38	2.1280	11 55 14.9	14.579
4	11 28 29.66	1.9850	N. 0 3 57.0	15.535	4	13 6 36.21	2.1329	12 9 48.1	14.526
5	11 30 28.80	1.9863	S. 0 11 35.4	15.544	5	13 8 44.33	2.1379	12 24 18.0	14.471
6	11 32 28.01	1.9876	0 27 8.3	15.552	6	13 10 52.76	2.1430	12 38 44.6	14.414
7	11 34 27.31	1.9890	0 42 41.6	15.558	7	13 13 1.49	2.1481	12 53 7.7	14.356
8	11 36 26.69	1.9904	0 58 15.3	15.565	8	13 15 10.53	2.1533	13 7 27.3	14.297
9	11 38 26.16	1.9920	1 13 49.4	15.570	9	13 17 19.88	2.1584	13 21 43.3	14.236
10	11 40 25.73	1.9937	1 29 23.7	15.573	10	13 19 29.54	2.1638	13 35 55.6	14.173
11	11 42 25.40	1.9953	1 44 58.1	15.574	11	13 21 39.53	2.1692	13 50 4.1	14.109
12	11 44 25.17	1.9971	2 0 32.6	15.575	12	13 23 49.84	2.1746	14 4 8.7	14.043
13	11 46 25.05	1.9990	2 16 7.1	15.574	13	13 26 0.48	2.1801	14 18 9.3	13.976
14	11 48 25.05	2.0009	2 31 41.5	15.573	14	13 28 11.45	2.1857	14 32 5.8	13.908
15	11 50 25.16	2.0029	2 47 15.8	15.570	15	13 30 22.76	2.1913	14 45 58.2	13.838
16	11 52 25.40	2.0051	3 2 49.9	15.566	16	13 32 34.40	2.1969	14 59 46.3	13.765
17	11 54 25.77	2.0073	3 18 23.7	15.560	17	13 34 46.39	2.2028	15 13 30.0	13.692
18	11 56 26.27	2.0095	3 33 57.1	15.553	18	13 36 58.73	2.2086	15 27 9.3	13.617
19	11 58 26.91	2.0118	3 49 30.0	15.544	19	13 39 11.42	2.2144	15 40 44.0	13.540
20	12 0 27.69	2.0143	4 5 2.4	15.536	20	13 41 24.46	2.2203	15 54 14.1	13.463
21	12 2 28.62	2.0168	4 20 34.3	15.526	21	13 43 37.86	2.2264	16 7 39.5	13.383
22	12 4 29.70	2.0193	4 36 5.5	15.513	22	13 45 51.63	2.2325	16 21 0.0	13.301
23	12 6 30.93	2.0219	S. 4 51 35.9	15.500	23	13 48 5.76	2.2385	S. 16 34 15.6	13.218
SATURDAY 14.					MONDAY 16.				
0	12 8 32.33	2.0248	S. 5 7 5.5	15.485	0	13 50 20.25	2.2446	S. 16 47 26.2	13.133
1	12 10 33.90	2.0275	5 22 34.1	15.469	1	13 52 35.11	2.2508	17 0 31.6	13.047
2	12 12 35.63	2.0303	5 38 1.8	15.453	2	13 54 50.35	2.2571	17 13 31.8	12.959
3	12 14 37.54	2.0333	5 53 28.4	15.434	3	13 57 5.96	2.2633	17 26 26.7	12.870
4	12 16 39.63	2.0363	6 8 53.9	15.414	4	13 59 21.95	2.2697	17 39 16.2	12.779
5	12 18 41.90	2.0395	6 24 18.1	15.393	5	14 1 38.32	2.2761	17 52 0.2	12.687
6	12 20 44.37	2.0428	6 39 41.0	15.370	6	14 3 55.08	2.2826	18 4 38.6	12.592
7	12 22 47.03	2.0460	6 55 2.5	15.347	7	14 6 12.23	2.2890	18 17 11.2	12.496
8	12 24 49.89	2.0494	7 10 22.6	15.322	8	14 8 29.76	2.2954	18 29 38.1	12.398
9	12 26 52.96	2.0528	7 25 41.1	15.295	9	14 10 47.68	2.3020	18 41 59.0	12.298
10	12 28 56.23	2.0563	7 40 58.0	15.268	10	14 13 6.00	2.3086	18 54 13.9	12.198
11	12 30 59.72	2.0600	7 56 13.2	15.238	11	14 15 24.71	2.3151	19 6 22.7	12.095
12	12 33 3.43	2.0637	8 11 26.6	15.208	12	14 17 43.81	2.3218	19 18 25.3	11.991
13	12 35 7.36	2.0673	8 26 38.1	15.175	13	14 20 3.32	2.3285	19 30 21.6	11.885
14	12 37 11.51	2.0712	8 41 47.6	15.142	14	14 22 23.23	2.3352	19 42 11.5	11.778
15	12 39 15.90	2.0752	8 56 55.1	15.108	15	14 24 43.54	2.3418	19 53 54.9	11.668
16	12 41 20.53	2.0792	9 12 0.5	15.072	16	14 27 4.25	2.3485	20 5 31.7	11.558
17	12 43 25.40	2.0833	9 27 3.7	15.034	17	14 29 25.36	2.3553	20 17 1.8	11.445
18	12 45 30.52	2.0873	9 42 4.6	14.995	18	14 31 46.88	2.3621	20 28 25.1	11.331
19	12 47 35.88	2.0915	9 57 3.1	14.954	19	14 34 8.81	2.3689	20 39 41.5	11.215
20	12 49 41.50	2.0958	10 11 59.1	14.912	20	14 36 31.15	2.3757	20 50 50.9	11.098
21	12 51 47.38	2.1003	10 26 52.5	14.869	21	14 38 53.89	2.3824	21 1 53.2	10.978
22	12 53 53.53	2.1047	10 41 43.4	14.825	22	14 41 17.04	2.3893	21 12 48.3	10.857
23	12 55 59.94	2.1092	10 56 31.5	14.778	23	14 43 40.60	2.3960	21 23 36.0	10.734
24	12 58 6.63	2.1138	S. 11 11 16.8	14.731	24	14 46 4.56	2.4028	S. 21 34 16.4	10.611

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
TUESDAY 17.					THURSDAY 19.				
0	h m s	s	° ' "	"	0	h m s	s	° ' "	"
0	14 46 4.56	2.4028	S. 21 34 16.4	10.611	0	16 48 28.84	2.6660	S. 27 11 1.7	2.903
1	14 48 28.93	2.4096	21 44 49.3	10.484	1	16 51 8.89	2.6688	27 13 50.2	2.714
2	14 50 53.71	2.4164	21 55 14.5	10.356	2	16 53 49.10	2.6715	27 16 27.4	2.525
3	14 53 18.90	2.4232	22 5 32.0	10.228	3	16 56 29.47	2.6740	27 18 53.2	2.335
4	14 55 44.49	2.4299	22 15 41.8	10.097	4	16 59 9.98	2.6763	27 21 7.6	2.145
5	14 58 10.49	2.4367	22 25 43.6	9.963	5	17 1 50.63	2.6786	27 23 10.6	1.953
6	15 0 36.89	2.4434	22 35 37.4	9.829	6	17 4 31.41	2.6806	27 25 2.0	1.760
7	15 3 3.70	2.4502	22 45 23.1	9.694	7	17 7 12.30	2.6824	27 26 42.0	1.570
8	15 5 30.91	2.4568	22 55 0.7	9.558	8	17 9 53.30	2.6841	27 28 10.4	1.378
9	15 7 58.52	2.4635	23 4 30.0	9.418	9	17 12 34.39	2.6856	27 29 27.3	1.185
10	15 10 26.53	2.4702	23 13 50.9	9.278	10	17 15 15.57	2.6869	27 30 32.6	0.992
11	15 12 54.94	2.4768	23 23 3.3	9.135	11	17 17 56.82	2.6881	27 31 26.3	0.798
12	15 15 23.74	2.4833	23 32 7.1	8.991	12	17 20 38.14	2.6892	27 32 8.3	0.603
13	15 17 52.93	2.4898	23 41 2.2	8.846	13	17 23 19.51	2.6899	27 32 38.7	0.410
14	15 20 22.52	2.4963	23 49 48.6	8.699	14	17 26 0.93	2.6906	27 32 57.5	0.216
15	15 22 52.49	2.5028	23 58 26.1	8.551	15	17 28 42.38	2.6911	27 33 4.6	-0.021
16	15 25 22.85	2.5092	24 6 54.7	8.401	16	17 31 23.86	2.6914	27 33 0.0	+0.173
17	15 27 53.59	2.5155	24 15 14.2	8.249	17	17 34 5.35	2.6914	27 32 43.8	0.368
18	15 30 24.71	2.5218	24 23 24.6	8.097	18	17 36 46.83	2.6913	27 32 15.9	0.166
19	15 32 56.20	2.5279	24 31 25.8	7.942	19	17 39 28.31	2.6912	27 31 36.4	0.756
20	15 35 28.06	2.5341	24 39 17.6	7.786	20	17 42 9.77	2.6908	27 30 45.2	0.990
21	15 38 0.29	2.5402	24 47 0.1	7.628	21	17 44 51.20	2.6902	27 29 42.4	1.144
22	15 40 32.88	2.5462	24 54 33.0	7.469	22	17 47 32.59	2.6894	27 28 27.9	1.338
23	15 43 5.83	2.5521	S. 25 1 56.4	7.309	23	17 50 13.93	2.6885	S. 27 27 1.8	1.533
WEDNESDAY 18.					FRIDAY 20.				
0	h m s	s	° ' "	"	0	h m s	s	° ' "	"
0	15 45 39.13	2.5579	S. 25 9 10.1	7.148	0	17 52 55.21	2.6874	S. 27 25 24.0	1.727
1	15 48 12.78	2.5638	25 16 14.1	6.984	1	17 55 36.42	2.6862	27 23 34.6	1.919
2	15 50 46.78	2.5694	25 23 8.2	6.819	2	17 58 17.55	2.6847	27 21 33.7	2.112
3	15 53 21.11	2.5750	25 29 52.4	6.653	3	18 0 58.58	2.6830	27 19 21.2	2.304
4	15 55 55.78	2.5806	25 36 26.6	6.486	4	18 3 39.51	2.6813	27 16 57.2	2.496
5	15 58 30.78	2.5859	25 42 50.7	6.319	5	18 6 20.33	2.6793	27 14 21.7	2.688
6	16 1 6.09	2.5912	25 49 4.7	6.148	6	18 9 1.03	2.6772	27 11 34.7	2.878
7	16 3 41.72	2.5964	25 55 8.5	5.977	7	18 11 41.59	2.6748	27 8 36.3	3.069
8	16 6 17.66	2.6015	26 1 1.9	5.804	8	18 14 22.01	2.6724	27 5 26.4	3.259
9	16 8 53.90	2.6065	26 6 45.0	5.631	9	18 17 2.28	2.6698	27 2 5.2	3.449
10	16 11 30.44	2.6113	26 12 17.6	5.456	10	18 19 42.39	2.6671	26 58 32.6	3.637
11	16 14 7.26	2.6161	26 17 39.7	5.281	11	18 22 22.33	2.6642	26 54 48.8	3.824
12	16 16 44.37	2.6208	26 22 51.3	5.104	12	18 25 2.09	2.6611	26 50 53.7	4.012
13	16 19 21.76	2.6253	26 27 52.2	4.926	13	18 27 41.66	2.6578	26 46 47.4	4.198
14	16 21 59.41	2.6297	26 32 42.4	4.747	14	18 30 21.03	2.6544	26 42 30.0	4.383
15	16 24 37.32	2.6339	26 37 21.8	4.566	15	18 33 0.19	2.6508	26 38 1.5	4.568
16	16 27 15.48	2.6380	26 41 50.3	4.384	16	18 35 39.13	2.6471	26 33 21.9	4.751
17	16 29 53.88	2.6420	26 46 7.9	4.203	17	18 38 17.84	2.6433	26 28 31.4	4.933
18	16 32 32.52	2.6459	26 50 14.6	4.020	18	18 40 56.32	2.6393	26 23 29.9	5.116
19	16 35 11.39	2.6497	26 54 10.3	3.836	19	18 43 34.56	2.6353	26 18 17.5	5.297
20	16 37 50.48	2.6533	26 57 54.9	3.651	20	18 46 12.55	2.6310	26 12 54.3	5.476
21	16 40 29.78	2.6567	27 1 28.4	3.465	21	18 48 50.28	2.6266	26 7 20.4	5.654
22	16 43 9.28	2.6599	27 4 50.7	3.278	22	18 51 27.74	2.6221	26 1 35.8	5.832
23	16 45 48.97	2.6630	27 8 1.8	3.092	23	18 54 4.93	2.6174	25 55 40.6	6.008
24	16 48 28.84	2.6660	S. 27 11 1.7	2.903	24	18 56 41.83	2.6126	S. 25 49 34.8	6.184

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
SATURDAY 21.					MONDAY 23.				
0	h m s	s	° ' "	"	0	h m s	s	° ' "	"
0	18 56 41.83	2.6126	S. 25 49 34.8	6.184	0	20 55 3.24	2.3031	S. 17 59 26.2	12.757
1	18 59 18.44	2.6078	25 43 18.5	6.358	1	20 57 21.22	2.2963	17 46 38.0	12.850
2	19 1 54.76	2.6028	25 36 51.9	6.529	2	20 59 38.79	2.2895	17 33 44.2	12.942
3	19 4 30.77	2.5976	25 30 15.0	6.701	3	21 1 55.06	2.2828	17 20 45.0	13.032
4	19 7 6.47	2.5923	25 23 27.8	6.871	4	21 4 12.72	2.2759	17 7 40.4	13.121
5	19 9 41.85	2.5870	25 16 30.5	7.039	5	21 6 29.07	2.2693	16 54 30.5	13.208
6	19 12 16.91	2.5816	25 9 23.1	7.207	6	21 8 45.03	2.2626	16 41 15.5	13.292
7	19 14 51.64	2.5761	25 2 5.7	7.373	7	21 11 0.58	2.2559	16 27 55.5	13.374
8	19 17 26.04	2.5704	24 54 38.4	7.537	8	21 13 15.74	2.2493	16 14 30.6	13.456
9	19 20 0.09	2.5647	24 47 1.3	7.700	9	21 15 30.50	2.2428	16 1 0.8	13.536
10	19 22 33.80	2.5589	24 39 14.4	7.863	10	21 17 44.87	2.2363	15 47 26.3	13.613
11	19 25 7.16	2.5530	24 31 17.8	8.023	11	21 19 58.85	2.2298	15 33 47.2	13.688
12	19 27 40.16	2.5469	24 23 11.7	8.181	12	21 22 12.45	2.2234	15 20 3.7	13.762
13	19 30 12.79	2.5408	24 14 56.1	8.338	13	21 24 25.66	2.2170	15 6 15.8	13.834
14	19 32 45.06	2.5347	24 6 31.2	8.493	14	21 26 38.40	2.2108	14 52 23.6	13.905
15	19 35 16.95	2.5284	23 57 56.9	8.648	15	21 28 50.95	2.2045	14 38 27.2	13.973
16	19 37 48.47	2.5222	23 49 13.5	8.799	16	21 31 3.03	2.1983	14 24 26.8	14.040
17	19 40 19.61	2.5158	23 40 21.0	8.950	17	21 33 14.74	2.1921	14 10 22.4	14.106
18	19 42 50.37	2.5094	23 31 19.5	9.099	18	21 35 26.08	2.1860	13 56 14.1	14.170
19	19 45 20.74	2.5028	23 22 9.1	9.247	19	21 37 37.06	2.1800	13 42 2.0	14.232
20	19 47 50.71	2.4963	23 12 49.9	9.393	20	21 39 47.68	2.1740	13 27 46.3	14.291
21	19 50 20.29	2.4897	23 3 22.0	9.537	21	21 41 57.94	2.1681	13 13 27.1	14.349
22	19 52 49.47	2.4831	22 53 45.5	9.679	22	21 44 7.85	2.1623	12 59 4.4	14.407
23	19 55 18.26	2.4764	S. 22 44 0.5	9.820	23	21 46 17.41	2.1564	S. 12 44 38.3	14.462
SUNDAY 22.					TUESDAY 24.				
0	19 57 46.64	2.4696	S. 22 34 7.1	9.959	0	21 48 26.62	2.1506	S. 12 30 9.0	14.515
1	20 0 14.61	2.4628	22 24 5.4	10.096	1	21 50 35.48	2.1449	12 15 36.5	14.567
2	20 2 42.18	2.4561	22 13 55.6	10.231	2	21 52 44.01	2.1393	12 1 1.0	14.616
3	20 5 9.34	2.4492	22 3 37.7	10.365	3	21 54 52.20	2.1338	11 46 22.6	14.664
4	20 7 36.08	2.4423	21 53 11.8	10.498	4	21 57 0.06	2.1283	11 31 41.3	14.711
5	20 10 2.41	2.4354	21 42 38.0	10.628	5	21 59 7.60	2.1229	11 16 57.3	14.756
6	20 12 28.33	2.4285	21 31 56.5	10.756	6	22 1 14.81	2.1175	11 2 10.6	14.800
7	20 14 53.83	2.4215	21 21 7.3	10.883	7	22 3 21.70	2.1122	10 47 21.3	14.842
8	20 17 18.91	2.4146	21 10 10.6	11.008	8	22 5 28.27	2.1069	10 32 29.6	14.882
9	20 19 43.58	2.4076	20 59 6.4	11.131	9	22 7 34.53	2.1018	10 17 35.5	14.921
10	20 22 7.82	2.4006	20 47 54.9	11.252	10	22 9 40.49	2.0968	10 2 39.1	14.958
11	20 24 31.65	2.3936	20 36 36.2	11.371	11	22 11 46.14	2.0918	9 47 40.6	14.993
12	20 26 55.05	2.3866	20 25 10.4	11.488	12	22 13 51.50	2.0868	9 32 39.9	15.028
13	20 29 18.04	2.3796	20 13 37.6	11.604	13	22 15 56.56	2.0819	9 17 37.2	15.060
14	20 31 40.60	2.3726	20 1 57.9	11.718	14	22 18 1.33	2.0772	9 2 32.7	15.090
15	20 34 2.75	2.3656	19 50 11.4	11.830	15	22 20 5.82	2.0724	8 47 26.4	15.120
16	20 36 24.47	2.3586	19 38 18.3	11.940	16	22 22 10.02	2.0678	8 32 18.3	15.148
17	20 38 45.78	2.3517	19 26 18.6	12.048	17	22 24 13.95	2.0632	8 17 8.6	15.175
18	20 41 6.67	2.3447	19 14 12.5	12.155	18	22 26 17.60	2.0587	8 1 57.3	15.200
19	20 43 27.14	2.3377	19 2 0.0	12.260	19	22 28 20.99	2.0543	7 46 44.6	15.223
20	20 45 47.19	2.3307	18 49 41.3	12.363	20	22 30 24.12	2.0499	7 31 30.6	15.245
21	20 48 6.82	2.3238	18 37 16.4	12.464	21	22 32 26.98	2.0456	7 16 15.2	15.266
22	20 50 26.04	2.3169	18 24 45.6	12.563	22	22 34 29.59	2.0414	7 0 58.7	15.284
23	20 52 44.85	2.3100	18 12 8.8	12.662	23	22 36 31.95	2.0373	6 45 41.1	15.303
24	20 55 3.24	2.3031	S. 17 59 26.2	12.757	24	22 38 34.06	2.0332	S. 6 30 22.4	15.319

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	I
WEDNESDAY 25.					FRIDAY 27.				
0	h m s	s	° ' "	"	0	h m s	s	° ' "	"
0	22 38 34.06	2.0332	S. 6 30 22.4	15.319	0	0 12 55.31	1.9268	N. 5 39 25.9	1
1	22 40 35.93	2.0293	6 15 2.8	15.333	1	0 14 50.90	1.9263	5 54 3.5	1
2	22 42 37.57	2.0253	5 59 42.4	15.347	2	0 16 46.47	1.9259	6 8 38.6	1
3	22 44 38.97	2.0215	5 44 21.2	15.359	3	0 18 42.01	1.9256	6 23 11.2	1
4	22 46 40.15	2.0178	5 28 59.3	15.370	4	0 20 37.54	1.9252	6 37 41.3	1
5	22 48 41.10	2.0140	5 13 36.8	15.379	5	0 22 33.05	1.9252	6 52 8.7	1
6	22 50 41.83	2.0104	4 58 13.8	15.388	6	0 24 28.56	1.9251	7 6 33.5	1
7	22 52 42.35	2.0069	4 42 50.3	15.394	7	0 26 24.06	1.9250	7 20 55.5	1
8	22 54 42.66	2.0034	4 27 26.5	15.399	8	0 28 19.56	1.9250	7 35 14.7	1
9	22 56 42.76	2.0001	4 12 2.4	15.404	9	0 30 15.06	1.9251	7 49 31.1	1
10	22 58 42.67	1.9968	3 56 38.0	15.408	10	0 32 10.57	1.9253	8 3 44.6	1
11	23 0 42.38	1.9936	3 41 13.5	15.408	11	0 34 6.09	1.9255	8 17 55.2	1
12	23 2 41.90	1.9904	3 25 49.0	15.408	12	0 36 1.63	1.9258	8 32 2.8	1
13	23 4 41.23	1.9873	3 10 24.5	15.408	13	0 37 57.19	1.9262	8 46 7.3	1
14	23 6 40.38	1.9843	2 55 0.1	15.405	14	0 39 52.77	1.9265	9 0 8.7	1
15	23 8 39.35	1.9814	2 39 35.9	15.402	15	0 41 48.37	1.9269	9 14 7.0	1
16	23 10 38.15	1.9786	2 24 11.9	15.397	16	0 43 44.00	1.9275	9 28 2.0	1
17	23 12 36.78	1.9758	2 8 48.3	15.390	17	0 45 39.67	1.9282	9 41 53.8	1
18	23 14 35.25	1.9732	1 53 25.1	15.383	18	0 47 35.38	1.9288	9 55 42.3	1
19	23 16 33.56	1.9706	1 38 2.3	15.375	19	0 49 31.12	1.9294	10 9 27.5	1
20	23 18 31.72	1.9680	1 22 40.1	15.365	20	0 51 26.91	1.9303	10 23 9.2	1
21	23 20 29.72	1.9655	1 7 18.5	15.354	21	0 53 22.75	1.9311	10 36 47.5	1
22	23 22 27.58	1.9631	0 51 57.6	15.343	22	0 55 18.64	1.9319	10 50 22.2	1
23	23 24 25.29	1.9608	S. 0 36 37.4	15.329	23	0 57 14.58	1.9328	N. 11 3 53.4	1
THURSDAY 26.					SATURDAY 28.				
0	23 26 22.87	1.9586	S. 0 21 18.1	15.314	0	0 59 10.58	1.9338	N. 11 17 21.0	1
1	23 28 20.32	1.9564	S. 0 5 59.7	15.299	1	1 1 6.64	1.9349	11 30 44.9	1
2	23 30 17.64	1.9543	N. 0 9 17.8	15.283	2	1 3 2.77	1.9361	11 44 5.1	1
3	23 32 14.84	1.9523	0 24 34.3	15.265	3	1 4 58.97	1.9373	11 57 21.6	1
4	23 34 11.92	1.9503	0 39 49.6	15.246	4	1 6 55.24	1.9384	12 10 34.3	1
5	23 36 8.88	1.9484	0 55 3.8	15.226	5	1 8 51.58	1.9397	12 23 43.2	1
6	23 38 5.73	1.9467	1 10 16.7	15.204	6	1 10 48.00	1.9410	12 36 48.1	1
7	23 40 2.48	1.9450	1 25 28.3	15.183	7	1 12 44.50	1.9424	12 49 49.1	1
8	23 41 59.13	1.9433	1 40 38.6	15.160	8	1 14 41.09	1.9438	13 2 46.1	1
9	23 43 55.68	1.9418	1 55 47.5	15.135	9	1 16 37.76	1.9453	13 15 39.1	1
10	23 45 52.14	1.9403	2 10 54.8	15.109	10	1 18 34.53	1.9469	13 28 28.0	1
11	23 47 48.51	1.9388	2 26 0.6	15.083	11	1 20 31.39	1.9485	13 41 12.8	1
12	23 49 44.80	1.9375	2 41 4.7	15.055	12	1 22 28.35	1.9502	13 53 53.4	1
13	23 51 41.01	1.9363	2 56 7.2	15.027	13	1 24 25.41	1.9518	14 6 29.8	1
14	23 53 37.15	1.9350	3 11 7.9	14.997	14	1 26 22.57	1.9536	14 19 1.9	1
15	23 55 33.21	1.9338	3 26 6.8	14.967	15	1 28 19.84	1.9553	14 31 29.7	1
16	23 57 29.21	1.9328	3 41 3.9	14.935	16	1 30 17.21	1.9572	14 43 53.2	1
17	23 59 25.14	1.9318	3 55 59.0	14.903	17	1 32 14.70	1.9592	14 56 12.2	1
18	0 1 21.02	1.9309	4 10 52.2	14.869	18	1 34 12.31	1.9611	15 8 26.8	1
19	0 3 16.85	1.9300	4 25 43.3	14.834	19	1 36 10.03	1.9630	15 20 36.9	1
20	0 5 12.62	1.9292	4 40 32.3	14.798	20	1 38 7.87	1.9650	15 32 42.5	1
21	0 7 8.35	1.9285	4 55 19.1	14.762	21	1 40 5.83	1.9671	15 44 43.5	1
22	0 9 4.04	1.9278	5 10 3.7	14.724	22	1 42 3.92	1.9692	15 56 39.9	1
23	0 10 59.69	1.9273	5 24 46.0	14.685	23	1 44 2.13	1.9713	16 8 31.6	1
24	0 12 55.31	1.9268	N. 5 39 25.9	14.646	24	1 46 0.48	1.9736	N. 16 20 18.6	1

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
SUNDAY 29.					TUESDAY 31.				
0	h m s	s	° ' "	"	0	h m s	s	° ' "	"
1	1 46 0.48	1.9736	N. 16 20 18.6	11.744	1	3 23 50.60	2.1099	N. 23 59 52.2	7.148
2	1 47 58.06	1.9758	16 32 0.9	11.664	2	3 25 57.29	2.1130	24 6 57.8	7.038
3	1 49 57.57	1.9781	16 43 38.3	11.583	3	3 28 4.16	2.1160	24 13 56.7	6.925
4	1 51 56.33	1.9804	16 55 10.9	11.503	4	3 30 11.21	2.1190	24 20 48.8	6.813
5	1 53 55.22	1.9827	17 6 38.6	11.421	5	3 32 18.44	2.1221	24 27 34.2	6.700
6	1 55 54.25	1.9851	17 18 1.4	11.338	6	3 34 25.86	2.1251	24 34 12.8	6.586
7	1 57 53.43	1.9876	17 29 19.2	11.255	7	3 36 33.45	2.1280	24 40 44.5	6.472
8	1 59 52.76	1.9900	17 40 32.0	11.172	8	3 38 41.22	2.1310	24 47 9.4	6.358
9	2 1 52.23	1.9924	17 51 39.8	11.087	9	3 40 49.17	2.1340	24 53 27.4	6.242
10	2 3 51.85	1.9950	18 2 42.4	11.001	10	3 42 57.30	2.1369	24 59 38.4	6.125
11	2 5 51.63	1.9976	18 13 39.9	10.916	11	3 45 5.60	2.1398	25 5 42.4	6.008
12	2 7 51.56	2.0002	18 24 32.3	10.829	12	3 47 14.08	2.1428	25 11 39.4	5.892
13	2 9 51.65	2.0028	18 35 19.4	10.741	13	3 49 22.73	2.1456	25 17 29.4	5.774
14	2 11 51.90	2.0055	18 46 1.2	10.653	14	3 51 31.55	2.1484	25 23 12.3	5.656
15	2 13 52.31	2.0082	18 56 37.7	10.564	15	3 53 40.54	2.1513	25 28 48.1	5.537
16	2 15 52.88	2.0108	19 7 8.9	10.475	16	3 55 49.70	2.1541	25 34 16.7	5.418
17	2 17 53.61	2.0136	19 17 34.7	10.384	17	3 57 59.03	2.1568	25 39 38.2	5.298
18	2 19 54.51	2.0163	19 27 55.0	10.293	18	4 0 8.52	2.1595	25 44 52.5	5.178
19	2 21 55.57	2.0192	19 38 9.9	10.203	19	4 2 18.17	2.1623	25 49 59.6	5.058
20	2 23 56.81	2.0221	19 48 19.3	10.110	20	4 4 27.99	2.1649	25 54 59.4	4.936
21	2 25 58.22	2.0249	19 58 23.1	10.017	21	4 6 37.96	2.1675	25 59 51.9	4.814
22	2 27 59.80	2.0278	20 8 21.3	9.925	22	4 8 48.09	2.1702	26 4 37.1	4.692
23	2 30 1.55	2.0306	20 18 13.8	9.828	23	4 10 58.38	2.1728	26 9 14.9	4.569
24	2 32 3.47	2.0335	N. 20 28 0.7	9.733	24	4 13 8.82	2.1753	N. 26 13 45.4	4.447
MONDAY 30.					WEDNESDAY, SEPTEMBER 1.				
0	2 34 5.57	2.0365	N. 20 37 41.8	9.638	0	4 15 19.41	2.1778	N. 26 18 8.5	4.323
1	2 36 7.85	2.0394	20 47 17.2	9.547					
2	2 38 10.30	2.0423	20 56 46.8	9.445					
3	2 40 12.93	2.0453	21 6 10.6	9.348					
4	2 42 15.74	2.0483	21 15 28.5	9.249					
5	2 44 18.73	2.0514	21 24 40.5	9.150					
6	2 46 21.91	2.0545	21 33 46.5	9.050					
7	2 48 25.27	2.0575	21 42 46.5	8.950					
8	2 50 28.81	2.0605	21 51 40.5	8.849					
9	2 52 32.53	2.0636	22 0 28.4	8.748					
10	2 54 36.44	2.0667	22 9 10.2	8.645					
11	2 56 40.53	2.0697	22 17 45.8	8.543					
12	2 58 44.80	2.0728	22 26 15.3	8.439					
13	3 0 49.26	2.0759	22 34 38.5	8.335					
14	3 2 53.91	2.0790	22 42 55.5	8.230					
15	3 4 58.74	2.0821	22 51 6.1	8.124					
16	3 7 3.76	2.0853	22 59 10.4	8.018					
17	3 9 8.97	2.0883	23 7 8.3	7.912					
18	3 11 14.36	2.0914	23 14 59.8	7.805					
19	3 13 19.94	2.0945	23 22 44.9	7.698					
20	3 15 25.70	2.0976	23 30 23.5	7.589					
21	3 17 31.65	2.1007	23 37 55.6	7.480					
22	3 19 37.78	2.1038	23 45 21.1	7.370					
23	3 21 44.10	2.1068	23 52 40.0	7.259					
24	3 23 50.60	2.1099	N. 23 59 52.2	7.148					

PHASES OF THE MOON.

	d	h	m
☾ Last Quarter Aug.	2	9	27.3
● New Moon	10	10	52.4
☾ First Quarter	17	14	17.4
○ Full Moon	24	9	40.5

	d	h
☾ Apogee Aug.	4	14.6
☾ Perigee	20	2.2

AT GREENWICH APPARENT NOON.

Day of the Week.	Day of the Month.	THE SUN'S					Sideral Time of Semidiameter Passing Meridian.	Equation Time, to be Added to Subtract from Apparent Time.
		Apparent Right Ascension.	Diff. for 1 Hour.	Apparent Declination.	Diff. for 1 Hour.	Semidiameter.		
		^h ^m ^s	^s	[°] ['] ["]	["]	['] ["]	^s	^m ^s
Wed.	1	10 38 29.48	9.079	N. 8 35 24.3	-54.15	15 52.85	64.40	0 13.0
Thur.	2	10 42 7.24	9.067	8 13 40.5	54.49	15 53.07	64.36	0 5.6
Fri.	3	10 45 44.73	9.056	7 51 48.6	54.82	15 53.29	64.32	0 24.6
Sat.	4	10 49 21.95	9.046	7 29 49.1	-55.14	15 53.52	64.28	0 43.9
SUN.	5	10 52 58.92	9.036	7 7 42.1	55.44	15 53.75	64.24	1 3.4
Mon.	6	10 56 35.67	9.027	6 45 28.0	55.73	15 53.99	64.21	1 23.2
Tues.	7	11 0 12.19	9.018	6 23 7.3	-56.00	15 54.23	64.18	1 43.2
Wed.	8	11 3 48.52	9.010	6 0 40.2	56.26	15 54.47	64.15	2 3.3
Thur.	9	11 7 24.67	9.003	5 38 7.0	56.50	15 54.71	64.12	2 23.7
Fri.	10	11 11 0.64	8.996	5 15 28.2	-56.73	15 54.96	64.09	2 44.2
Sat.	11	11 14 36.47	8.990	4 52 44.1	56.94	15 55.21	64.07	3 4.9
SUN.	12	11 18 12.15	8.984	4 29 55.1	57.14	15 55.47	64.05	3 25.7
Mon.	13	11 21 47.71	8.979	4 7 1.5	-57.32	15 55.73	64.04	3 46.6
Tues.	14	11 25 23.16	8.975	3 44 3.6	57.49	15 55.99	64.03	4 7.7
Wed.	15	11 28 58.52	8.972	3 21 1.9	57.64	15 56.25	64.02	4 28.8
Thur.	16	11 32 33.81	8.970	2 57 56.6	-57.78	15 56.51	64.01	4 50.0
Fri.	17	11 36 9.05	8.968	2 34 48.1	57.91	15 56.78	64.01	5 11.3
Sat.	18	11 39 44.25	8.967	2 11 36.7	58.03	15 57.05	64.01	5 32.6
SUN.	19	11 43 19.45	8.967	1 48 22.8	-58.13	15 57.31	64.01	5 53.9
Mon.	20	11 46 54.66	8.968	1 25 6.6	58.22	15 57.58	64.02	6 15.2
Tues.	21	11 50 29.90	8.970	1 1 48.4	58.29	15 57.85	64.03	6 36.4
Wed.	22	11 54 5.21	8.973	0 38 28.6	-58.35	15 58.12	64.04	6 57.6
Thur.	23	11 57 40.60	8.977	N. 0 15 7.4	58.40	15 58.40	64.06	7 18.7
Fri.	24	12 1 16.10	8.982	S. 0 8 14.8	58.44	15 58.67	64.08	7 39.7
Sat.	25	12 4 51.73	8.988	0 31 37.7	-58.46	15 58.94	64.10	8 0.6
SUN.	26	12 8 27.52	8.995	0 55 1.0	58.47	15 59.21	64.12	8 21.3
Mon.	27	12 12 3.48	9.003	1 18 24.4	58.47	15 59.47	64.14	8 41.8
Tues.	28	12 15 39.65	9.012	1 41 47.5	-58.45	15 59.74	64.17	9 2.1
Wed.	29	12 19 16.04	9.022	2 5 10.0	58.42	16 0.01	64.20	9 22.3
Thur.	30	12 22 52.68	9.033	2 28 31.7	58.37	16 0.28	64.23	9 42.1
Fri.	31	12 26 29.58	9.044	S. 2 51 52.0	-58.31	16 0.55	64.27	10 1.7

NOTE.—The mean time of semidiameter passing the meridian may be found by subtracting 0°.18 from 1 time.

The sign — prefixed to the hourly change of declination indicates that north declinations are south declinations increasing.

AT GREENWICH MEAN NOON.

Day of the Week.	Day of the Month.	THE SUN'S				Equation of Time, to be Subtracted from		Diff. for 1 Hour.	Sidereal Time, or Right Ascension of Mean Sun.
		Apparent Right Ascension.	Diff. for 1 Hour.	Apparent Declination.	Diff. for 1 Hour.	Added to Mean Time.			
		h m s	s	° ' "	"	m s	s	h m s	
Wed.	1	10 38 29.45	9.081	N. 8 35 24.5	-54.16	0 13.08	0.775	10 38 16.37	
Thur.	2	10 42 7.26	9.070	8 13 40.4	54.50	0 5.67	0.787	10 42 12.93	
Fri.	3	10 45 44.79	9.059	7 51 48.3	54.82	0 24.69	0.798	10 46 9.48	
Sat.	4	10 49 22.06	9.048	7 29 48.4	-55.14	0 43.97	0.809	10 50 6.03	
SUN.	5	10 52 59.08	9.038	7 7 41.1	55.45	1 3.50	0.819	10 54 2.59	
Mon.	6	10 56 35.88	9.029	6 45 26.8	55.74	1 23.27	0.828	10 57 59.14	
Tues.	7	11 0 12.45	9.020	6 23 5.7	-56.01	1 43.24	0.836	11 1 55.70	
Wed.	8	11 3 48.83	9.012	6 0 38.2	56.27	2 3.42	0.844	11 5 52.25	
Thur.	9	11 7 25.03	9.005	5 38 4.8	56.51	2 23.77	0.852	11 9 48.80	
Fri.	10	11 11 1.06	8.998	5 15 25.6	-56.74	2 44.30	0.859	11 13 45.36	
Sat.	11	11 14 36.93	8.991	4 52 41.2	56.95	3 4.98	0.865	11 17 41.91	
SUN.	12	11 18 12.66	8.986	4 29 51.8	57.15	3 25.80	0.870	11 21 38.46	
Mon.	13	11 21 48.27	8.982	4 6 57.8	-57.34	3 46.74	0.875	11 25 35.02	
Tues.	14	11 25 23.78	8.978	3 43 59.6	57.51	4 7.80	0.879	11 29 31.57	
Wed.	15	11 28 59.19	8.974	3 20 57.6	57.66	4 28.94	0.882	11 33 28.13	
Thur.	16	11 32 34.53	8.972	2 57 52.0	-57.80	4 50.15	0.885	11 37 24.68	
Fri.	17	11 36 9.82	8.970	2 34 43.1	57.93	5 11.41	0.886	11 41 21.23	
Sat.	18	11 39 45.08	8.969	2 11 31.4	58.04	5 32.70	0.887	11 45 17.79	
SUN.	19	11 43 20.33	8.969	1 48 17.1	-58.14	5 54.01	0.887	11 49 14.34	
Mon.	20	11 46 55.59	8.970	1 25 0.5	58.23	6 15.30	0.886	11 53 10.89	
Tues.	21	11 50 30.89	8.972	1 1 42.0	58.31	6 36.55	0.884	11 57 7.45	
Wed.	22	11 54 6.25	8.975	0 38 21.8	-58.37	6 57.75	0.881	12 1 4.00	
Thur.	23	11 57 41.70	8.979	N. 0 15 0.3	58.42	7 18.86	0.877	12 5 0.55	
Fri.	24	12 1 17.25	8.984	S. 0 8 22.2	58.45	7 39.86	0.872	12 8 57.11	
Sat.	25	12 4 52.93	8.990	0 31 45.5	-58.48	8 0.73	0.866	12 12 53.66	
SUN.	26	12 8 28.77	8.997	0 55 9.1	58.49	8 21.44	0.859	12 16 50.21	
Mon.	27	12 12 4.79	9.005	1 18 32.8	58.48	8 41.98	0.851	12 20 46.77	
Tues.	28	12 15 41.01	9.014	1 41 56.3	-58.46	9 2.32	0.843	12 24 43.32	
Wed.	29	12 19 17.45	9.024	2 5 19.2	58.43	9 22.42	0.833	12 28 39.87	
Thur.	30	12 22 54.14	9.035	2 28 41.1	58.39	9 42.29	0.822	12 32 36.43	
Fri.	31	12 26 31.09	9.046	S. 2 52 1.7	-58.33	10 1.89	0.810	12 36 32.98	

NOTE.—The semidiameter for mean noon may be assumed the same as that for apparent noon.

The sign — prefixed to the hourly change of declination indicates that north declinations are decreasing; south declinations increasing.

Diff. for 1 Hour,
+9.8565.
(Table III.)

AT GREENWICH MEAN NOON.

Day of the Month.	Day of the Year.	THE SUN'S				Logarithm of the Radius Vector of the Earth.	Diff. for 1 Hour.	Mean Time of Sidereal Noon.		
		True Longitude.		Diff. for 1 Hour.	Latitude.					
		λ	λ'							
		$^{\circ}$	$'$	$''$	$'$	$''$		h	m	s
1	244	157 57 46.4	57 0.5	145.18	+0.55	0.003 9239	-42.0	13 19 32.2		
2	245	158 55 51.6	55 5.6	145.26	0.49	0.003 8226	42.5	13 15 36.38		
3	246	159 53 58.7	53 12.6	145.34	0.40	0.003 7201	43.0	13 11 40.47		
4	247	160 52 7.8	51 21.5	145.42	+0.30	0.003 6162	-43.5	13 7 44.56		
5	248	161 50 18.9	49 32.5	145.50	0.19	0.003 5110	44.1	13 3 48.65		
6	249	162 48 31.8	47 45.3	145.58	+0.06	0.003 4044	44.7	12 59 52.74		
7	250	163 46 46.7	46 0.0	145.66	-0.07	0.003 2963	-45.4	12 55 56.84		
8	251	164 45 3.4	44 16.7	145.74	0.21	0.003 1866	46.0	12 52 0.93		
9	252	165 43 22.1	42 35.2	145.82	0.33	0.003 0754	46.7	12 48 5.02		
10	253	166 41 42.5	40 55.5	145.89	-0.44	0.002 9626	-47.3	12 44 9.11		
11	254	167 40 4.6	39 17.6	145.96	0.53	0.002 8483	47.9	12 40 13.20		
12	255	168 38 28.5	37 41.3	146.03	0.59	0.002 7325	48.5	12 36 17.30		
13	256	169 36 54.0	36 6.7	146.10	-0.62	0.002 6154	-49.0	12 32 21.39		
14	257	170 35 21.1	34 33.7	146.16	0.63	0.002 4970	49.5	12 28 25.48		
15	258	171 33 49.8	33 2.3	146.23	0.59	0.002 3776	49.9	12 24 29.57		
16	259	172 32 20.1	31 32.5	146.30	-0.52	0.002 2574	-50.3	12 20 33.66		
17	260	173 30 52.0	30 4.3	146.36	0.42	0.002 1364	50.5	12 16 37.76		
18	261	174 29 25.5	28 37.6	146.43	0.30	0.002 0149	50.7	12 12 41.85		
19	262	175 28 0.6	27 12.7	146.50	-0.17	0.001 8931	-50.8	12 8 45.94		
20	263	176 26 37.5	25 49.4	146.57	-0.03	0.001 7710	50.9	12 4 50.04		
21	264	177 25 16.1	24 27.9	146.65	+0.10	0.001 6490	50.9	12 0 54.13		
22	265	178 23 56.5	23 8.3	146.73	+0.22	0.001 5269	-50.8	11 56 58.22		
23	266	179 22 38.9	21 50.6	146.81	0.33	0.001 4049	50.8	11 53 2.31		
24	267	180 21 23.3	20 34.8	146.89	0.41	0.001 2830	50.8	11 49 6.40		
25	268	181 20 9.7	19 21.1	146.98	+0.47	0.001 1612	-50.7	11 45 10.50		
26	269	182 18 58.2	18 9.6	147.07	0.51	0.001 0395	50.7	11 41 14.59		
27	270	183 17 48.9	17 0.1	147.16	0.52	0.000 9179	50.7	11 37 18.68		
28	271	184 16 41.8	15 52.9	147.25	+0.50	0.000 7963	-50.6	11 33 22.78		
29	272	185 15 37.0	14 48.0	147.34	0.45	0.000 6747	50.6	11 29 26.87		
30	273	186 14 34.4	13 45.3	147.44	0.37	0.000 5531	50.7	11 25 30.96		
31	274	187 13 34.0	12 44.8	147.54	+0.27	0.000 4312	-50.8	11 21 35.05		

NOTE.—The longitudes in the column λ are referred to the true equinox of their own date, while those in the column λ' are referred to the mean equinox of the beginning of the Besselian fictitious year.

Diff. for 1 Hour,
—9^h.8296.
(Table II.)

GREENWICH MEAN TIME.

Day of the Month.	THE MOON'S									
	SEMI- DIAMETER.		HORIZONTAL PARALLAX.				UPPER TRANSIT.		AGE.	
	Noon.	Midnight.	Noon.	Diff. for 1 Hour.	Midnight.	Diff. for 1 Hour.	Meridian of Greenwich.	Diff. for 1 Hour.	Noon.	
	' "	' "	' "	"	' "	"	h m	m	d	
1	14 48.5	14 48.3	54 14.99	-0.165	54 14.30	+0.050	18 14.1	2.12	21.5	
2	14 48.8	14 50.0	54 16.20	+0.266	54 20.67	0.478	19 5.5	2.15	22.5	
3	14 52.0	14 54.5	54 27.64	0.682	54 37.00	0.875	19 56.8	2.12	23.5	
4	14 57.6	15 1.4	54 48.58	+1.051	55 2.17	+1.210	20 47.3	2.08	24.5	
5	15 5.6	15 10.2	55 17.54	1.349	55 34.45	1.466	21 36.3	2.01	25.5	
6	15 15.1	15 20.3	55 52.61	1.556	56 11.68	1.618	22 23.8	1.95	26.5	
7	15 25.6	15 31.1	56 31.33	+1.651	56 51.19	+1.654	23 10.0	1.90	27.5	
8	15 36.4	15 41.7	57 10.90	1.626	57 30.11	1.570	23 55.7	1.90	28.5	
9	15 46.7	15 51.4	57 48.48	1.487	58 5.70	1.380	6	.	0.0	
10	15 55.7	15 59.5	58 21.51	+1.252	58 35.69	+1.108	0 41.9	1.95	1.0	
11	16 2.9	16 5.8	58 48.06	0.953	58 58.53	0.792	1 29.7	2.04	2.0	
12	16 8.1	16 9.9	59 7.06	0.630	59 13.66	0.471	2 20.3	2.18	3.0	
13	16 11.2	16 12.0	59 18.38	+0.317	59 21.31	+0.172	3 14.5	2.34	4.0	
14	16 12.3	16 12.2	59 22.55	+0.036	59 22.23	-0.087	4 12.5	2.49	5.0	
15	16 11.8	16 10.9	59 20.50	-0.200	59 17.46	0.305	5 13.7	2.59	6.0	
16	16 9.8	16 8.3	59 13.21	-0.402	59 7.84	-0.492	6 16.1	2.59	7.0	
17	16 6.6	16 4.5	59 1.42	0.578	58 53.97	0.663	7 17.1	2.48	8.0	
18	16 2.2	15 59.6	58 45.50	0.748	58 36.02	0.832	8 14.9	2.32	9.0	
19	15 56.8	15 53.6	58 25.54	-0.914	58 14.08	-0.996	9 8.5	2.15	10.0	
20	15 50.3	15 46.6	58 1.65	1.076	57 48.26	1.154	9 58.2	2.00	11.0	
21	15 42.7	15 38.6	57 33.98	1.224	57 18.91	1.286	10 44.8	1.89	12.0	
22	15 34.3	15 29.9	57 3.16	-1.337	56 46.89	-1.373	11 29.3	1.83	13.0	
23	15 25.4	15 20.8	56 30.28	1.392	56 13.55	1.393	12 13.0	1.82	14.0	
24	15 16.3	15 11.8	55 56.93	1.374	55 40.66	1.333	12 56.7	1.84	15.0	
25	15 7.6	15 3.6	55 25.02	-1.270	55 10.26	-1.186	13 41.5	1.89	16.0	
26	14 59.8	14 56.5	54 56.64	1.081	54 44.40	0.956	14 27.8	1.97	17.0	
27	14 53.6	14 51.2	54 33.78	0.811	54 25.01	0.648	15 15.9	2.04	18.0	
28	14 49.4	14 48.2	54 18.28	-0.471	54 13.76	-0.281	16 5.7	2.10	19.0	
29	14 47.6	14 47.6	54 11.59	-0.080	54 11.88	+0.130	16 56.6	2.13	20.0	
30	14 48.4	14 49.9	54 14.73	+0.345	54 20.17	0.561	17 47.6	2.11	21.0	
31	14 52.1	14 55.0	54 28.20	+0.777	54 38.81	+0.990	18 37.9	2.07	22.0	

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
WEDNESDAY 1.					FRIDAY 3.				
	h m s	s	° ' "	"		h m s	s	° ' "	"
0	4 15 19.41	2.1778	N. 26 18 8.5	4.323	0	6 1 47.17	2.2358	N. 27 16 46.1	1.965
1	4 17 30.15	2.1803	26 22 24.2	4.199	1	6 4 1.31	2.2355	27 14 44.2	2.099
2	4 19 41.04	2.1827	26 26 32.4	4.074	2	6 6 15.43	2.2352	27 12 34.2	2.233
3	4 21 52.07	2.1850	26 30 33.1	3.949	3	6 8 29.53	2.2348	27 10 16.2	2.367
4	4 24 3.24	2.1873	26 34 26.3	3.824	4	6 10 43.61	2.2343	27 7 50.2	2.501
5	4 26 14.55	2.1896	26 38 12.0	3.699	5	6 12 57.65	2.2338	27 5 16.1	2.635
6	4 28 25.99	2.1918	26 41 50.2	3.573	6	6 15 11.66	2.2332	27 2 34.0	2.768
7	4 30 37.57	2.1941	26 45 20.7	3.446	7	6 17 25.63	2.2325	26 59 43.9	2.902
8	4 32 49.28	2.1963	26 48 43.7	3.320	8	6 19 39.56	2.2318	26 56 45.8	3.035
9	4 35 1.12	2.1983	26 51 59.1	3.193	9	6 21 53.44	2.2309	26 53 39.7	3.168
10	4 37 13.08	2.2004	26 55 6.8	3.066	10	6 24 7.27	2.2301	26 50 25.6	3.302
11	4 39 25.17	2.2024	26 58 6.8	2.936	11	6 26 21.05	2.2292	26 47 3.5	3.434
12	4 41 37.37	2.2043	27 0 59.1	2.808	12	6 28 34.78	2.2283	26 43 33.5	3.567
13	4 43 49.69	2.2062	27 3 43.7	2.679	13	6 30 48.45	2.2273	26 39 55.5	3.699
14	4 46 2.12	2.2081	27 6 20.6	2.550	14	6 33 2.05	2.2262	26 36 9.6	3.832
15	4 48 14.66	2.2099	27 8 49.7	2.421	15	6 35 15.59	2.2251	26 32 15.7	3.964
16	4 50 27.31	2.2117	27 11 11.1	2.291	16	6 37 29.06	2.2238	26 28 13.9	4.096
17	4 52 40.06	2.2133	27 13 24.6	2.161	17	6 39 42.45	2.2226	26 24 4.2	4.228
18	4 54 52.91	2.2150	27 15 30.4	2.031	18	6 41 55.77	2.2213	26 19 46.6	4.360
19	4 57 5.86	2.2166	27 17 28.3	1.899	19	6 44 9.01	2.2200	26 15 21.2	4.492
20	4 59 18.90	2.2181	27 19 18.3	1.768	20	6 46 22.17	2.2186	26 10 47.9	4.624
21	5 1 32.03	2.2196	27 21 0.5	1.638	21	6 48 35.24	2.2172	26 6 6.8	4.756
22	5 3 45.25	2.2210	27 22 34.9	1.507	22	6 50 48.23	2.2157	26 1 17.8	4.888
23	5 5 58.55	2.2223	N. 27 24 1.3	1.374	23	6 53 1.12	2.2141	N. 25 56 21.0	5.021
THURSDAY 2.					SATURDAY 4.				
	h m s	s	° ' "	"		h m s	s	° ' "	"
0	5 8 11.93	2.2236	N. 27 25 19.8	1.243	0	6 55 13.92	2.2125	N. 25 51 16.5	5.140
1	5 10 25.38	2.2248	27 26 30.4	1.111	1	6 57 26.62	2.2108	25 46 4.2	5.269
2	5 12 38.91	2.2261	27 27 33.1	0.978	2	6 59 39.22	2.2092	25 40 44.2	5.398
3	5 14 52.51	2.2272	27 28 27.8	0.846	3	7 1 51.72	2.2074	25 35 16.4	5.527
4	5 17 6.17	2.2283	27 29 14.6	0.713	4	7 4 4.11	2.2057	25 29 40.9	5.655
5	5 19 19.90	2.2293	27 29 53.4	0.580	5	7 6 16.40	2.2038	25 23 57.8	5.783
6	5 21 33.68	2.2301	27 30 24.2	0.447	6	7 8 28.57	2.2019	25 18 7.0	5.910
7	5 23 47.51	2.2309	27 30 47.1	0.314	7	7 10 40.63	2.2000	25 12 8.6	6.036
8	5 26 1.39	2.2317	27 31 1.9	0.180	8	7 12 52.57	2.1981	25 6 2.7	6.163
9	5 28 15.32	2.2325	27 31 8.7	+0.047	9	7 15 4.40	2.1962	24 59 49.1	6.289
10	5 30 29.29	2.2332	27 31 7.5	-0.087	10	7 17 16.11	2.1941	24 53 28.0	6.414
11	5 32 43.30	2.2338	27 30 58.3	0.221	11	7 19 27.69	2.1920	24 46 59.4	6.539
12	5 34 57.35	2.2344	27 30 41.0	0.355	12	7 21 39.15	2.1900	24 40 23.3	6.664
13	5 37 11.43	2.2348	27 30 15.7	0.488	13	7 23 50.49	2.1878	24 33 39.7	6.788
14	5 39 25.53	2.2352	27 29 42.4	0.623	14	7 26 1.69	2.1856	24 26 48.7	6.912
15	5 41 39.65	2.2355	27 29 1.0	0.757	15	7 28 12.76	2.1834	24 19 50.3	7.034
16	5 43 53.79	2.2358	27 28 11.6	0.891	16	7 30 23.70	2.1813	24 12 44.6	7.157
17	5 46 7.95	2.2361	27 27 14.1	1.025	17	7 32 34.50	2.1789	24 5 31.5	7.280
18	5 48 22.12	2.2363	27 26 8.6	1.159	18	7 34 45.17	2.1767	23 58 11.0	7.402
19	5 50 36.30	2.2363	27 24 55.0	1.294	19	7 36 55.70	2.1743	23 50 43.3	7.524
20	5 52 50.48	2.2363	27 23 33.3	1.428	20	7 39 6.09	2.1720	23 43 8.4	7.646
21	5 55 4.66	2.2363	27 22 3.6	1.563	21	7 41 16.34	2.1697	23 35 26.2	7.768
22	5 57 18.84	2.2363	27 20 25.8	1.697	22	7 43 26.45	2.1673	23 27 36.8	7.891
23	5 59 33.01	2.2361	27 18 40.0	1.831	23	7 45 36.41	2.1648	23 19 40.3	8.013
24	6 1 47.17	2.2358	N. 27 16 46.1	1.965	24	7 47 46.23	2.1624	N. 23 11 36.7	8.139

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
SUNDAY 5.					TUESDAY 7.				
0	h m s	s	"	"	0	h m s	s	"	"
0	7 47 46.23	2.1624	N. 23 11 36.7	8.119	0	9 28 41.93	2.0472	N. 14 38 47.7	12.945
1	7 49 55.90	2.1600	23 3 26.0	8.237	1	9 30 44.71	2.0453	14 25 48.6	13.025
2	7 52 5.43	2.1576	22 55 8.2	8.354	2	9 32 47.37	2.0435	14 12 44.7	13.104
3	7 54 14.81	2.1550	22 46 43.5	8.470	3	9 34 49.93	2.0417	13 59 36.1	13.182
4	7 56 24.03	2.1525	22 38 11.8	8.587	4	9 36 52.37	2.0398	13 46 22.8	13.259
5	7 58 33.11	2.1501	22 29 33.1	8.702	5	9 38 54.71	2.0382	13 33 5.0	13.334
6	8 0 42.04	2.1476	22 20 47.6	8.816	6	9 40 56.95	2.0365	13 19 42.7	13.409
7	8 2 50.82	2.1450	22 11 55.2	8.930	7	9 42 59.09	2.0348	13 6 15.9	13.484
8	8 4 59.44	2.1424	22 2 56.0	9.043	8	9 45 1.13	2.0333	12 52 44.6	13.557
9	8 7 7.91	2.1399	21 53 50.0	9.156	9	9 47 3.08	2.0317	12 39 0.0	13.629
10	8 9 16.23	2.1374	21 44 37.3	9.268	10	9 49 4.93	2.0302	12 25 29.1	13.700
11	8 11 24.40	2.1348	21 35 17.9	9.379	11	9 51 6.70	2.0288	12 11 45.0	13.770
12	8 13 32.41	2.1323	21 25 51.8	9.490	12	9 53 8.38	2.0273	11 57 56.7	13.839
13	8 15 40.27	2.1297	21 16 19.1	9.599	13	9 55 9.98	2.0259	11 44 4.3	13.907
14	8 17 47.97	2.1271	21 6 39.9	9.708	14	9 57 11.49	2.0246	11 30 7.9	13.973
15	8 19 55.52	2.1246	20 56 54.1	9.817	15	9 59 12.93	2.0233	11 16 7.5	14.039
16	8 22 2.92	2.1220	20 47 1.8	9.925	16	10 1 14.29	2.0221	11 2 3.2	14.104
17	8 24 10.16	2.1194	20 37 3.1	10.032	17	10 3 15.58	2.0209	10 47 55.0	14.168
18	8 26 17.25	2.1168	20 26 58.0	10.138	18	10 5 16.80	2.0198	10 33 43.0	14.231
19	8 28 24.18	2.1143	20 16 46.6	10.243	19	10 7 17.96	2.0188	10 19 27.3	14.293
20	8 30 30.96	2.1118	20 6 28.8	10.348	20	10 9 19.06	2.0178	10 5 7.9	14.353
21	8 32 37.59	2.1092	19 56 4.8	10.452	21	10 11 20.10	2.0168	9 50 44.9	14.413
22	8 34 44.06	2.1066	19 45 34.6	10.555	22	10 13 21.08	2.0158	9 36 18.4	14.471
23	8 36 50.38	2.1041	N. 19 34 58.2	10.657	23	10 15 22.00	2.0150	N. 9 21 48.4	14.528
MONDAY 6.					WEDNESDAY 8.				
0	8 38 56.55	2.1016	N. 19 24 15.7	10.759	0	10 17 22.88	2.0142	N. 9 7 15.0	14.584
1	8 41 2.57	2.0991	19 13 27.1	10.860	1	10 19 23.71	2.0135	8 52 38.3	14.639
2	8 43 8.44	2.0966	19 2 32.5	10.960	2	10 21 24.50	2.0128	8 37 58.3	14.693
3	8 45 14.16	2.0941	18 51 31.9	11.059	3	10 23 25.25	2.0122	8 23 15.1	14.746
4	8 47 19.73	2.0916	18 40 25.4	11.158	4	10 25 25.97	2.0117	8 8 28.8	14.798
5	8 49 25.15	2.0892	18 29 13.0	11.256	5	10 27 26.65	2.0111	7 53 39.4	14.848
6	8 51 30.43	2.0867	18 17 54.7	11.353	6	10 29 27.30	2.0107	7 38 47.0	14.898
7	8 53 35.56	2.0843	18 6 30.7	11.448	7	10 31 27.93	2.0103	7 23 51.6	14.947
8	8 55 40.55	2.0820	17 55 0.9	11.543	8	10 33 28.54	2.0100	7 8 53.3	14.994
9	8 57 45.40	2.0796	17 43 25.5	11.637	9	10 35 29.13	2.0097	6 53 52.3	15.039
10	8 59 50.10	2.0772	17 31 44.4	11.731	10	10 37 29.70	2.0095	6 38 48.6	15.085
11	9 1 54.66	2.0748	17 19 57.8	11.823	11	10 39 30.27	2.0094	6 23 42.1	15.129
12	9 3 59.08	2.0726	17 8 5.6	11.916	12	10 41 30.83	2.0093	6 8 33.1	15.171
13	9 6 3.37	2.0703	16 56 7.9	12.007	13	10 43 31.39	2.0093	5 53 21.6	15.212
14	9 8 7.52	2.0680	16 44 4.8	12.096	14	10 45 31.95	2.0093	5 38 7.6	15.252
15	9 10 11.53	2.0658	16 31 56.4	12.185	15	10 47 32.51	2.0094	5 22 51.3	15.291
16	9 12 15.41	2.0637	16 19 42.6	12.273	16	10 49 33.08	2.0097	5 7 32.7	15.329
17	9 14 19.17	2.0615	16 7 23.6	12.360	17	10 51 33.67	2.0099	4 52 11.8	15.366
18	9 16 22.79	2.0593	15 54 59.4	12.447	18	10 53 34.27	2.0102	4 36 48.8	15.401
19	9 18 26.29	2.0572	15 42 30.0	12.533	19	10 55 34.89	2.0106	4 21 23.7	15.436
20	9 20 29.66	2.0551	15 29 55.5	12.617	20	10 57 35.54	2.0111	4 5 56.5	15.469
21	9 22 32.90	2.0531	15 17 16.0	12.700	21	10 59 36.22	2.0116	3 50 27.4	15.500
22	9 24 36.03	2.0512	15 4 31.5	12.783	22	11 1 36.93	2.0121	3 34 56.5	15.530
23	9 26 39.04	2.0492	14 51 42.0	12.865	23	11 3 37.67	2.0128	3 19 23.8	15.559
24	9 28 41.93	2.0472	N. 14 38 47.7	12.945	24	11 5 38.46	2.0136	N. 3 3 49.4	15.587

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
THURSDAY 9.					SATURDAY 11.				
0	h m s	s	N. 3 3 49.4	15.587	0	h m s	s	S. 9 31 0.4	15.374
1	11 7 39.30	2.0143	2 48 13.3	15.614	1	12 46 36.64	2.1369	9 46 18.0	15.572
2	11 9 40.18	2.0152	2 32 35.7	15.639	2	12 48 44.98	2.1412	10 1 33.0	15.528
3	11 11 41.12	2.0161	2 16 56.6	15.663	3	12 50 53.58	2.1456	10 16 45.4	15.183
4	11 13 42.11	2.0170	2 1 16.1	15.686	4	12 53 2.45	2.1501	10 31 55.0	15.136
5	11 15 43.16	2.0181	1 45 34.3	15.708	5	12 55 11.59	2.1546	10 47 1.7	15.087
6	11 17 44.28	2.0193	1 29 51.2	15.728	6	12 57 21.00	2.1592	11 2 5.4	15.037
7	11 19 45.47	2.0205	1 14 6.9	15.748	7	12 59 30.69	2.1638	11 17 6.1	14.985
8	11 21 46.74	2.0218	0 58 21.5	15.765	8	13 1 40.66	2.1685	11 32 3.6	14.932
9	11 23 48.08	2.0231	0 42 35.1	15.781	9	13 3 50.91	2.1733	11 46 57.9	14.877
10	11 25 49.51	2.0245	0 26 47.8	15.796	10	13 6 1.45	2.1782	12 1 48.8	14.820
11	11 27 51.02	2.0260	0 10 59.6	15.810	11	13 8 12.29	2.1831	12 16 36.3	14.762
12	11 29 52.63	2.0276	S. 0 4 49.4	15.822	12	13 10 23.42	2.1880	12 31 20.2	14.702
13	11 31 54.33	2.0292	0 20 39.1	15.833	13	13 12 34.85	2.1930	12 46 0.5	14.640
14	11 33 56.13	2.0309	0 36 29.4	15.842	14	13 14 46.58	2.1981	13 0 37.0	14.576
15	11 35 58.04	2.0327	0 52 20.2	15.850	15	13 16 58.62	2.2033	13 15 9.6	14.511
16	11 38 0.05	2.0345	1 8 11.4	15.857	16	13 19 10.97	2.2085	13 29 38.3	14.444
17	11 40 2.18	2.0365	1 24 3.1	15.863	17	13 21 23.64	2.2137	13 44 2.9	14.376
18	11 42 4.43	2.0385	1 39 55.0	15.867	18	13 23 36.62	2.2190	13 58 23.4	14.306
19	11 44 6.80	2.0406	1 55 47.1	15.870	19	13 25 49.92	2.2244	14 12 39.6	14.233
20	11 46 9.30	2.0427	2 11 39.4	15.872	20	13 28 3.55	2.2298	14 26 51.4	14.160
21	11 48 11.92	2.0448	2 27 31.7	15.872	21	13 30 17.50	2.2353	14 40 58.8	14.085
22	11 50 14.68	2.0472	2 43 24.0	15.870	22	13 32 31.78	2.2408	14 55 1.6	14.008
23	11 52 17.58	2.0496	S. 2 59 16.1	15.867	23	13 34 46.39	2.2463	S. 15 8 59.8	13.930
FRIDAY 10.					SUNDAY 12.				
0	h m s	s	S. 3 15 8.0	15.863	0	h m s	s	S. 15 22 53.2	13.849
1	11 56 23.82	2.0545	3 30 59.6	15.857	1	13 39 1.64	2.2576	15 36 41.7	13.768
2	11 58 27.17	2.0572	3 46 50.8	15.850	2	13 41 32.25	2.2633	15 50 25.3	13.684
3	12 0 30.68	2.0598	4 2 41.6	15.842	3	13 43 48.22	2.2690	16 4 3.8	13.598
4	12 2 34.35	2.0626	4 18 31.8	15.831	4	13 46 4.53	2.2748	16 17 37.1	13.511
5	12 4 38.19	2.0653	4 34 21.3	15.819	5	13 48 21.19	2.2806	16 31 5.1	13.422
6	12 6 42.19	2.0682	4 50 10.1	15.807	6	13 50 38.20	2.2865	16 44 27.7	13.332
7	12 8 46.37	2.0712	5 5 58.1	15.793	7	13 52 55.57	2.2924	16 57 44.9	13.240
8	12 10 50.73	2.0742	5 21 45.2	15.777	8	13 55 13.29	2.2983	17 10 56.5	13.146
9	12 12 55.28	2.0773	5 37 31.3	15.759	9	13 57 31.37	2.3043	17 24 2.4	13.050
10	12 15 0.01	2.0805	5 53 16.3	15.740	10	13 59 49.81	2.3103	17 37 2.5	12.952
11	12 17 4.94	2.0838	6 9 0.1	15.719	11	14 2 8.60	2.3163	17 49 56.7	12.853
12	12 19 10.07	2.0872	6 24 42.6	15.697	12	14 4 27.66	2.3223	18 2 44.9	12.752
13	12 21 15.40	2.0905	6 40 23.8	15.674	13	14 6 47.28	2.3284	18 15 27.0	12.650
14	12 23 20.93	2.0939	6 56 3.5	15.649	14	14 9 7.17	2.3345	18 28 2.9	12.546
15	12 25 26.67	2.0975	7 11 41.7	15.622	15	14 11 27.42	2.3406	18 40 32.5	12.439
16	12 27 32.63	2.1012	7 27 18.2	15.594	16	14 13 48.04	2.3467	18 52 55.6	12.332
17	12 29 38.81	2.1048	7 42 53.0	15.564	17	14 16 9.03	2.3529	19 5 12.3	12.223
18	12 31 45.21	2.1086	7 58 25.9	15.533	18	14 18 30.39	2.3591	19 17 22.4	12.112
19	12 33 51.84	2.1124	8 13 57.0	15.502	19	14 20 52.12	2.3653	19 29 25.7	11.998
20	12 35 58.70	2.1163	8 29 26.1	15.467	20	14 23 14.22	2.3714	19 41 22.2	11.884
21	12 38 5.80	2.1203	8 44 53.0	15.431	21	14 25 36.69	2.3777	19 53 11.8	11.768
22	12 40 13.14	2.1243	9 0 17.8	15.394	22	14 27 59.54	2.3838	20 4 54.4	11.651
23	12 42 20.72	2.1284	9 15 40.3	15.355	23	14 30 22.75	2.3900	20 16 29.9	11.531
24	12 44 28.55	2.1327	S. 9 31 0.4	15.314	24	14 32 46.34	2.3962	S. 20 27 58.1	11.409

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
MONDAY 13.					WEDNESDAY 15.				
0	h m s	s	° ' "	"	0	h m s	s	° ' "	"
0	14 32 46.34	2.3962	S. 20 27 58.1	11.409	0	16 34 13.62	2.6358	S. 26 47 1.5	3.883
1	14 35 10.30	2.4024	20 39 19.0	11.387	1	16 36 51.84	2.6383	26 50 49.0	3.699
2	14 37 34.63	2.4086	20 50 32.5	11.103	2	16 39 30.22	2.6408	26 54 25.4	3.514
3	14 39 59.33	2.4148	21 1 38.5	11.037	3	16 42 8.74	2.6431	26 57 50.7	3.329
4	14 42 24.41	2.4210	21 12 36.9	10.908	4	16 44 47.39	2.6452	27 1 4.9	3.144
5	14 44 49.85	2.4271	21 23 27.5	10.778	5	16 47 26.16	2.6472	27 4 8.0	2.958
6	14 47 15.66	2.4333	21 34 10.3	10.647	6	16 50 5.05	2.6490	27 6 59.9	2.772
7	14 49 41.84	2.4393	21 44 45.2	10.515	7	16 52 44.04	2.6507	27 9 40.6	2.585
8	14 52 8.38	2.4454	21 55 12.1	10.381	8	16 55 23.13	2.6523	27 12 10.1	2.397
9	14 54 35.29	2.4516	22 5 30.9	10.244	9	16 58 2.31	2.6537	27 14 28.3	2.209
10	14 57 2.57	2.4577	22 15 41.4	10.107	10	17 0 41.57	2.6549	27 16 35.2	2.021
11	14 59 30.21	2.4636	22 25 43.7	9.968	11	17 3 20.90	2.6559	27 18 30.8	1.833
12	15 1 58.20	2.4695	22 35 37.6	9.827	12	17 6 0.28	2.6568	27 20 15.2	1.645
13	15 4 26.55	2.4755	22 45 23.0	9.685	13	17 8 39.71	2.6576	27 21 48.2	1.455
14	15 6 55.26	2.4814	22 54 59.8	9.542	14	17 11 19.19	2.6582	27 23 9.8	1.266
15	15 9 24.32	2.4873	23 4 28.0	9.397	15	17 13 58.69	2.6585	27 24 20.1	1.077
16	15 11 53.73	2.4931	23 13 47.4	9.250	16	17 16 38.21	2.6588	27 25 19.0	0.888
17	15 14 23.49	2.4988	23 22 58.0	9.102	17	17 19 17.75	2.6590	27 26 6.6	0.698
18	15 16 53.59	2.5045	23 31 59.6	8.952	18	17 21 57.29	2.6589	27 26 42.8	0.509
19	15 19 24.03	2.5102	23 40 52.2	8.801	19	17 24 36.82	2.6587	27 27 7.7	0.320
20	15 21 54.81	2.5158	23 49 35.7	8.648	20	17 27 16.33	2.6583	27 27 21.2	-0.131
21	15 24 25.92	2.5213	23 58 10.0	8.494	21	17 29 55.82	2.6578	27 27 23.4	+0.058
22	15 26 57.36	2.5268	24 6 35.0	8.338	22	17 32 35.27	2.6571	27 27 14.2	0.248
23	15 29 29.13	2.5322	S. 24 14 50.6	8.182	23	17 35 14.67	2.6563	S. 27 26 53.7	0.437
TUESDAY 14.					THURSDAY 16.				
0	h m s	s	° ' "	"	0	h m s	s	° ' "	"
0	15 32 1.22	2.5375	S. 24 22 56.8	8.024	0	17 37 54.02	2.6553	S. 27 26 21.8	0.626
1	15 34 33.63	2.5427	24 30 53.5	7.865	1	17 40 33.31	2.6542	27 25 38.6	0.814
2	15 37 6.35	2.5479	24 38 40.6	7.703	2	17 43 12.52	2.6528	27 24 44.1	1.002
3	15 39 39.38	2.5530	24 46 17.9	7.541	3	17 45 51.64	2.6513	27 23 38.3	1.190
4	15 42 12.71	2.5579	24 53 45.5	7.378	4	17 48 30.67	2.6497	27 22 21.3	1.377
5	15 44 46.33	2.5628	25 1 3.3	7.213	5	17 51 9.60	2.6479	27 20 53.1	1.564
6	15 47 20.25	2.5677	25 8 11.1	7.048	6	17 53 48.42	2.6459	27 19 13.6	1.752
7	15 49 54.46	2.5725	25 15 0.0	6.881	7	17 56 27.11	2.6438	27 17 22.9	1.938
8	15 52 28.95	2.5771	25 21 56.8	6.713	8	17 59 5.68	2.6417	27 15 21.1	2.123
9	15 55 3.71	2.5816	25 28 34.5	6.543	9	18 1 44.11	2.6393	27 13 8.2	2.308
10	15 57 38.74	2.5860	25 35 1.9	6.372	10	18 4 22.39	2.6367	27 10 44.2	2.493
11	16 0 14.03	2.5903	25 41 19.1	6.201	11	18 7 0.51	2.6340	27 8 9.1	2.677
12	16 2 49.58	2.5946	25 47 26.0	6.028	12	18 9 38.47	2.6312	27 5 23.0	2.860
13	16 5 25.38	2.5987	25 53 22.5	5.854	13	18 12 16.25	2.6282	27 2 25.9	3.042
14	16 8 1.42	2.6027	25 59 8.5	5.679	14	18 14 53.85	2.6250	26 59 17.9	3.224
15	16 10 37.70	2.6066	26 4 44.0	5.504	15	18 17 31.25	2.6218	26 55 59.0	3.405
16	16 13 14.21	2.6103	26 10 9.0	5.327	16	18 20 8.46	2.6184	26 52 29.3	3.585
17	16 15 50.94	2.6140	26 15 23.3	5.149	17	18 22 45.46	2.6148	26 48 48.8	3.765
18	16 18 27.89	2.6175	26 20 26.9	4.971	18	18 25 22.24	2.6112	26 44 57.5	3.944
19	16 21 5.04	2.6208	26 25 19.8	4.792	19	18 27 58.80	2.6074	26 40 55.8	4.122
20	16 23 42.39	2.6241	26 30 1.9	4.611	20	18 30 35.13	2.6035	26 36 42.9	4.298
21	16 26 19.93	2.6272	26 34 33.1	4.430	21	18 33 11.22	2.5995	26 32 19.7	4.474
22	16 28 57.65	2.6302	26 38 53.5	4.249	22	18 35 47.07	2.5953	26 27 46.0	4.649
23	16 31 35.55	2.6331	26 43 3.0	4.067	23	18 38 22.66	2.5910	26 23 1.8	4.823
24	16 34 13.62	2.6358	S. 26 47 1.5	3.883	24	18 40 57.99	2.5866	S. 26 18 7.2	4.997

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
FRIDAY 17.					SUNDAY 19.				
0	h m s	s	° ' "	"	0	h m s	s	° ' "	"
0	18 40 57.99	2.5866	S. 26 18 7.2	4.997	0	20 38 32.49	2.2961	S. 19 23 40.1	11.706
1	18 43 33.05	2.5821	26 13 2.2	5.168	1	20 40 50.06	2.2896	19 11 54.7	11.808
2	18 46 7.84	2.5775	26 7 47.0	5.338	2	20 43 7.24	2.2832	19 0 3.2	11.908
3	18 48 42.35	2.5727	26 2 21.6	5.508	3	20 45 24.04	2.2768	18 48 5.8	12.008
4	18 51 16.57	2.5678	25 56 46.0	5.677	4	20 47 40.45	2.2703	18 36 2.5	12.108
5	18 53 50.49	2.5629	25 51 0.3	5.845	5	20 49 56.47	2.2638	18 23 53.4	12.198
6	18 56 24.12	2.5579	25 45 4.6	6.011	6	20 52 12.11	2.2575	18 11 38.7	12.299
7	18 58 57.44	2.5527	25 38 59.0	6.176	7	20 54 27.37	2.2511	17 59 18.4	12.388
8	19 1 30.45	2.5475	25 32 43.5	6.340	8	20 56 42.24	2.2448	17 46 52.6	12.475
9	19 4 3.14	2.5422	25 26 18.2	6.503	9	20 58 56.74	2.2385	17 34 21.4	12.564
10	19 6 35.51	2.5368	25 19 43.2	6.663	10	21 1 10.86	2.2323	17 21 44.9	12.652
11	19 9 7.55	2.5313	25 12 58.6	6.823	11	21 3 24.61	2.2261	17 9 3.2	12.739
12	19 11 39.26	2.5257	25 6 4.4	6.982	12	21 5 37.99	2.2199	16 56 16.4	12.825
13	19 14 10.63	2.5200	24 59 0.7	7.140	13	21 7 51.00	2.2138	16 43 24.7	12.908
14	19 16 41.66	2.5143	24 51 47.6	7.295	14	21 10 3.65	2.2077	16 30 28.0	12.995
15	19 19 12.35	2.5085	24 44 25.3	7.449	15	21 12 15.93	2.2017	16 17 26.5	13.084
16	19 21 42.68	2.5026	24 36 53.7	7.603	16	21 14 27.85	2.1957	16 4 20.3	13.174
17	19 24 12.66	2.4967	24 29 12.9	7.756	17	21 16 39.42	2.1898	15 51 9.5	13.261
18	19 26 42.28	2.4906	24 21 23.0	7.906	18	21 18 50.63	2.1839	15 37 54.2	13.348
19	19 29 11.53	2.4845	24 13 24.2	8.054	19	21 21 1.49	2.1781	15 24 34.4	13.435
20	19 31 40.42	2.4785	24 5 16.5	8.202	20	21 23 12.00	2.1723	15 11 10.3	13.522
21	19 34 8.95	2.4723	23 57 0.0	8.348	21	21 25 22.17	2.1666	14 57 42.0	13.609
22	19 36 37.10	2.4660	23 48 34.8	8.493	22	21 27 31.99	2.1609	14 44 9.5	13.695
23	19 39 4.87	2.4598	S. 23 40 0.9	8.637	23	21 29 41.48	2.1553	S. 14 30 32.9	13.782
SATURDAY 18.					MONDAY 20.				
0	h m s	s	° ' "	"	0	h m s	s	° ' "	"
0	19 41 32.27	2.4535	S. 23 31 18.4	8.778	0	21 31 50.63	2.1498	S. 14 16 52.4	13.869
1	19 43 59.29	2.4472	23 22 27.5	8.918	1	21 33 59.45	2.1443	14 3 8.0	13.957
2	19 46 25.93	2.4408	23 13 28.3	9.056	2	21 36 7.94	2.1388	13 49 19.8	14.044
3	19 48 52.18	2.4343	23 4 20.8	9.193	3	21 38 16.11	2.1334	13 35 27.9	14.131
4	19 51 18.04	2.4278	22 55 5.1	9.329	4	21 40 23.95	2.1281	13 21 32.4	14.218
5	19 53 43.52	2.4213	22 45 41.3	9.463	5	21 42 31.48	2.1228	13 7 33.4	14.305
6	19 56 8.60	2.4148	22 36 9.5	9.595	6	21 44 38.69	2.1176	12 53 31.0	14.392
7	19 58 33.29	2.4083	22 26 29.9	9.726	7	21 46 45.59	2.1125	12 39 25.3	14.479
8	20 0 57.59	2.4018	22 16 42.4	9.856	8	21 48 52.19	2.1074	12 25 16.3	14.566
9	20 3 21.50	2.3952	22 6 47.2	9.983	9	21 50 58.48	2.1023	12 11 4.1	14.653
10	20 5 45.01	2.3885	21 56 44.4	10.109	10	21 53 4.47	2.0974	11 56 48.9	14.740
11	20 8 8.12	2.3819	21 46 34.1	10.233	11	21 55 10.17	2.0926	11 42 30.7	14.827
12	20 10 30.84	2.3753	21 36 16.4	10.356	12	21 57 15.58	2.0878	11 28 9.6	14.914
13	20 12 53.16	2.3687	21 25 51.4	10.477	13	21 59 20.70	2.0830	11 13 45.7	15.001
14	20 15 15.08	2.3621	21 15 19.1	10.597	14	22 1 25.54	2.0783	10 59 19.1	15.088
15	20 17 36.61	2.3555	21 4 39.7	10.715	15	22 3 30.10	2.0737	10 44 49.9	15.175
16	20 19 57.74	2.3488	20 53 53.3	10.832	16	22 5 34.38	2.0691	10 30 18.2	15.262
17	20 22 18.47	2.3422	20 42 59.9	10.947	17	22 7 38.39	2.0647	10 15 44.0	15.349
18	20 24 38.80	2.3356	20 31 59.7	11.060	18	22 9 42.14	2.0602	10 1 7.4	15.436
19	20 26 58.74	2.3290	20 20 52.7	11.172	19	22 11 45.62	2.0558	9 46 28.5	15.523
20	20 29 18.28	2.3223	20 9 39.1	11.281	20	22 13 48.84	2.0516	9 31 47.4	15.610
21	20 31 37.42	2.3157	19 58 19.0	11.389	21	22 15 51.81	2.0474	9 17 4.1	15.697
22	20 33 56.17	2.3092	19 46 52.4	11.497	22	22 17 54.53	2.0433	9 2 18.8	15.784
23	20 36 14.53	2.3027	19 35 19.4	11.603	23	22 19 57.00	2.0392	8 47 31.6	15.871
24	20 38 32.49	2.2961	S. 19 23 40.1	11.706	24	22 21 59.23	2.0352	S. 8 32 42.5	15.958

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
TUESDAY 21.					THURSDAY 23.				
0	h m s	s	" "	" "	0	h m s	s	" "	" "
0	22 21 59.23	2.0352	S. 8 32 42.5	14.833	0	23 56 26.44	1.9277	N. 3 30 17.2	14.833
1	22 24 1.22	2.0313	8 17 51.6	14.862	1	23 58 22.09	1.9272	3 45 6.4	14.866
2	22 26 2.98	2.0274	8 2 59.0	14.891	2	0 0 17.71	1.9267	3 59 53.9	14.777
3	22 28 4.51	2.0236	7 48 4.7	14.918	3	0 2 13.30	1.9263	4 14 30.6	14.747
4	22 30 5.81	2.0199	7 33 8.9	14.942	4	0 4 8.87	1.9260	4 29 23.5	14.716
5	22 32 6.90	2.0163	7 18 11.7	14.966	5	0 6 4.42	1.9258	4 44 5.5	14.683
6	22 34 7.77	2.0128	7 3 13.0	14.989	6	0 7 59.96	1.9256	4 58 45.5	14.650
7	22 36 8.43	2.0093	6 48 13.0	15.010	7	0 9 55.49	1.9254	5 13 23.5	14.617
8	22 38 8.88	2.0058	6 33 11.8	15.030	8	0 11 51.01	1.9253	5 27 59.5	14.583
9	22 40 9.13	2.0024	6 18 9.4	15.048	9	0 13 46.53	1.9253	5 42 33.4	14.546
10	22 42 9.17	1.9991	6 3 6.0	15.066	10	0 15 42.05	1.9253	5 57 5.0	14.508
11	22 44 9.02	1.9960	5 48 1.5	15.083	11	0 17 37.57	1.9254	6 11 34.4	14.471
12	22 46 8.69	1.9929	5 32 56.1	15.097	12	0 19 33.10	1.9256	6 26 1.5	14.432
13	22 48 8.17	1.9898	5 17 49.9	15.110	13	0 21 28.64	1.9258	6 40 26.2	14.392
14	22 50 7.46	1.9868	5 2 42.9	15.122	14	0 23 24.20	1.9262	6 54 48.5	14.351
15	22 52 6.58	1.9839	4 47 35.2	15.133	15	0 25 19.78	1.9266	7 9 8.3	14.308
16	22 54 5.53	1.9811	4 32 26.9	15.143	16	0 27 15.39	1.9270	7 23 25.5	14.265
17	22 56 4.31	1.9783	4 17 18.1	15.151	17	0 29 11.02	1.9274	7 37 40.1	14.222
18	22 58 2.92	1.9756	4 2 8.8	15.158	18	0 31 6.68	1.9279	7 51 52.1	14.177
19	23 0 1.38	1.9730	3 46 59.1	15.164	19	0 33 2.37	1.9285	8 6 1.3	14.131
20	23 1 59.68	1.9704	3 31 49.1	15.169	20	0 34 58.10	1.9292	8 20 7.8	14.084
21	23 3 57.83	1.9679	3 16 38.8	15.173	21	0 36 53.87	1.9299	8 34 11.4	14.037
22	23 5 55.83	1.9655	3 1 28.3	15.176	22	0 38 49.69	1.9307	8 48 12.2	13.988
23	23 7 53.69	1.9632	S. 2 46 17.7	15.177	23	0 40 45.55	1.9315	N. 9 2 10.0	13.938
WEDNESDAY 22.					FRIDAY 24.				
0	h m s	s	" "	" "	0	h m s	s	" "	" "
0	23 9 51.41	1.9609	S. 2 31 7.1	15.176	0	0 42 41.47	1.9324	N. 9 16 4.8	13.887
1	23 11 49.00	1.9588	2 15 56.6	15.175	1	0 44 37.44	1.9333	9 29 56.5	13.836
2	23 13 46.46	1.9567	2 0 46.1	15.173	2	0 46 33.47	1.9343	9 43 45.1	13.784
3	23 15 43.80	1.9546	1 45 35.8	15.169	3	0 48 29.56	1.9353	9 57 30.6	13.731
4	23 17 41.01	1.9526	1 30 25.8	15.164	4	0 50 25.71	1.9364	10 11 12.8	13.677
5	23 19 38.11	1.9507	1 15 16.1	15.158	5	0 52 21.93	1.9376	10 24 51.8	13.622
6	23 21 35.10	1.9488	1 0 6.8	15.152	6	0 54 18.22	1.9388	10 38 27.4	13.565
7	23 23 31.97	1.9470	0 44 57.9	15.143	7	0 56 14.58	1.9400	10 51 59.6	13.508
8	23 25 28.74	1.9454	0 29 49.6	15.133	8	0 58 11.02	1.9413	11 5 28.3	13.450
9	23 27 25.42	1.9438	S. 0 14 41.9	15.123	9	1 0 7.54	1.9427	11 18 53.6	13.392
10	23 29 22.00	1.9422	N. 0 0 25.2	15.112	10	1 2 4.14	1.9441	11 32 15.3	13.332
11	23 31 18.48	1.9407	0 15 31.6	15.099	11	1 4 0.83	1.9456	11 45 33.4	13.272
12	23 33 14.88	1.9393	0 30 37.1	15.085	12	1 5 57.61	1.9471	11 58 47.9	13.210
13	23 35 11.20	1.9380	0 45 41.8	15.070	13	1 7 54.48	1.9486	12 11 58.6	13.148
14	23 37 7.44	1.9368	1 0 45.5	15.053	14	1 9 51.44	1.9502	12 25 5.6	13.084
15	23 39 3.61	1.9356	1 15 48.2	15.037	15	1 11 48.50	1.9518	12 38 8.7	13.020
16	23 40 59.71	1.9344	1 30 49.9	15.019	16	1 13 45.66	1.9536	12 51 8.0	12.956
17	23 42 55.74	1.9333	1 45 50.5	14.999	17	1 15 42.93	1.9553	13 4 3.4	12.890
18	23 44 51.71	1.9323	2 0 49.8	14.978	18	1 17 40.30	1.9571	13 16 54.8	12.823
19	23 46 47.62	1.9313	2 15 47.9	14.957	19	1 19 37.78	1.9589	13 29 42.2	12.756
20	23 48 43.47	1.9305	2 30 44.6	14.934	20	1 21 35.37	1.9608	13 42 25.5	12.687
21	23 50 39.28	1.9297	2 45 40.0	14.912	21	1 23 33.07	1.9627	13 55 4.6	12.618
22	23 52 35.04	1.9290	3 0 34.0	14.887	22	1 25 30.89	1.9647	14 7 39.6	12.548
23	23 54 30.76	1.9283	3 15 26.4	14.860	23	1 27 28.83	1.9667	14 20 10.3	12.477
24	23 56 26.44	1.9277	N. 3 30 17.2	14.833	24	1 29 26.89	1.9688	N. 14 32 36.8	12.405

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
SATURDAY 25.					MONDAY 27.				
0	h m s	s	° ' "	"	0	h m s	s	° ' "	"
0	1 29 26.80	1.9688	N. 14 32 36.8	12.405	0	3 6 52.37	2.0976	N. 22 50 14.1	8.043
1	1 31 25.08	1.9708	14 44 58.9	12.333	1	3 8 58.31	2.1005	22 58 13.4	7.935
2	1 33 23.39	1.9729	14 57 16.7	12.259	2	3 11 4.43	2.1034	23 6 6.3	7.827
3	1 35 21.83	1.9751	15 9 30.0	12.184	3	3 13 10.72	2.1063	23 13 52.6	7.717
4	1 37 20.40	1.9773	15 21 38.8	12.109	4	3 15 17.19	2.1092	23 21 32.3	7.607
5	1 39 19.10	1.9795	15 33 43.1	12.033	5	3 17 23.83	2.1121	23 29 5.4	7.496
6	1 41 17.94	1.9818	15 45 42.8	11.957	6	3 19 30.64	2.1149	23 36 31.8	7.384
7	1 43 16.92	1.9842	15 57 37.9	11.879	7	3 21 37.62	2.1178	23 43 51.5	7.272
8	1 45 16.04	1.9865	16 9 28.3	11.801	8	3 23 44.77	2.1206	23 51 4.5	7.160
9	1 47 15.30	1.9888	16 21 14.0	11.722	9	3 25 52.09	2.1234	23 58 10.7	7.047
10	1 49 14.70	1.9912	16 32 54.9	11.641	10	3 27 59.58	2.1262	24 5 10.1	6.933
11	1 51 14.25	1.9937	16 44 30.9	11.560	11	3 30 7.23	2.1289	24 12 2.7	6.819
12	1 53 13.94	1.9961	16 56 2.1	11.479	12	3 32 15.05	2.1317	24 18 48.4	6.704
13	1 55 13.78	1.9987	17 7 28.4	11.397	13	3 34 23.03	2.1344	24 25 27.2	6.589
14	1 57 13.78	2.0012	17 18 49.7	11.313	14	3 36 31.18	2.1372	24 31 59.1	6.473
15	1 59 13.93	2.0037	17 30 6.0	11.229	15	3 38 39.49	2.1398	24 38 24.0	6.357
16	2 1 14.23	2.0063	17 41 17.2	11.144	16	3 40 47.96	2.1424	24 44 41.9	6.240
17	2 3 14.69	2.0090	17 52 23.3	11.059	17	3 42 56.58	2.1450	24 50 52.8	6.122
18	2 5 15.31	2.0116	18 3 24.3	10.973	18	3 45 5.36	2.1477	24 56 56.6	6.004
19	2 7 16.08	2.0142	18 14 20.1	10.886	19	3 47 14.30	2.1503	25 2 53.3	5.886
20	2 9 17.01	2.0169	18 25 10.6	10.798	20	3 49 23.39	2.1528	25 8 42.9	5.767
21	2 11 18.11	2.0197	18 35 55.8	10.709	21	3 51 32.63	2.1553	25 14 25.3	5.648
22	2 13 19.37	2.0224	18 46 35.7	10.620	22	3 53 42.02	2.1577	25 20 0.6	5.528
23	2 15 20.80	2.0252	N. 18 57 10.2	10.530	23	3 55 51.55	2.1601	N. 25 25 28.7	5.407
SUNDAY 26.					TUESDAY 28.				
0	2 17 22.39	2.0279	N. 19 7 39.3	10.439	0	3 58 1.23	2.1625	N. 25 30 49.5	5.286
1	2 19 24.15	2.0307	19 18 2.9	10.347	1	4 0 11.05	2.1649	25 36 3.0	5.165
2	2 21 26.07	2.0335	19 28 21.0	10.255	2	4 2 21.02	2.1672	25 41 9.3	5.044
3	2 23 28.17	2.0364	19 38 33.5	10.162	3	4 4 31.12	2.1695	25 46 8.3	4.922
4	2 25 30.44	2.0392	19 48 40.4	10.068	4	4 6 41.36	2.1717	25 50 59.9	4.798
5	2 27 32.87	2.0420	19 58 41.6	9.973	5	4 8 51.73	2.1739	25 55 44.1	4.675
6	2 29 35.48	2.0449	20 8 37.1	9.878	6	4 11 2.23	2.1761	26 0 20.9	4.552
7	2 31 38.26	2.0478	20 18 26.9	9.782	7	4 13 12.86	2.1782	26 4 50.3	4.428
8	2 33 41.21	2.0507	20 28 10.9	9.685	8	4 15 23.62	2.1803	26 9 12.3	4.303
9	2 35 44.34	2.0536	20 37 49.1	9.587	9	4 17 34.50	2.1823	26 13 26.7	4.178
10	2 37 47.64	2.0565	20 47 21.4	9.489	10	4 19 45.50	2.1843	26 17 33.7	4.054
11	2 39 51.12	2.0594	20 56 47.8	9.391	11	4 21 56.62	2.1863	26 21 33.2	3.928
12	2 41 54.77	2.0623	21 6 8.3	9.291	12	4 24 7.86	2.1883	26 25 25.1	3.803
13	2 43 58.60	2.0653	21 15 22.7	9.190	13	4 26 19.21	2.1901	26 29 9.5	3.677
14	2 46 2.61	2.0683	21 24 31.1	9.089	14	4 28 30.67	2.1918	26 32 46.3	3.550
15	2 48 6.79	2.0712	21 33 33.4	8.987	15	4 30 42.23	2.1936	26 36 15.5	3.423
16	2 50 11.15	2.0741	21 42 29.6	8.885	16	4 32 53.90	2.1953	26 39 37.1	3.296
17	2 52 15.68	2.0770	21 51 19.6	8.782	17	4 35 5.67	2.1970	26 42 51.0	3.168
18	2 54 20.39	2.0800	22 0 3.5	8.679	18	4 37 17.54	2.1986	26 45 57.3	3.041
19	2 56 25.28	2.0830	22 8 41.1	8.574	19	4 39 29.50	2.2003	26 48 55.9	2.913
20	2 58 30.35	2.0859	22 17 12.4	8.469	20	4 41 41.56	2.2017	26 51 46.8	2.784
21	3 0 35.59	2.0888	22 25 37.4	8.364	21	4 43 53.70	2.2030	26 54 30.0	2.656
22	3 2 41.01	2.0918	22 33 56.1	8.258	22	4 46 5.92	2.2044	26 57 5.5	2.527
23	3 4 46.60	2.0947	22 42 8.3	8.150	23	4 48 18.23	2.2058	26 59 33.2	2.398
24	3 6 52.37	2.0976	N. 22 50 14.1	8.043	24	4 50 30.62	2.2071	N. 27 1 53.2	2.268

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
WEDNESDAY 29.					FRIDAY, OCTOBER 1.				
	<div>h m s</div>	<div>s</div>	<div>° ' "</div>	<div>"</div>		<div>h m s</div>	<div>s</div>	<div>° ' "</div>	<div>"</div>
0	4 50 30.62	2.2071	N. 27 1 53.2	2.268	0	6 36 48.05	2.1994	N. 26 19 54.5	4.004
1	4 52 43.08	2.2083	27 4 5.4	2.139					
2	4 54 55.62	2.2095	27 6 9.9	2.010					
3	4 57 8.22	2.2106	27 8 6.6	1.880					
4	4 59 20.89	2.2117	27 9 55.5	1.749					
5	5 1 33.62	2.2126	27 11 36.5	1.618					
6	5 3 46.40	2.2135	27 13 9.7	1.488					
7	5 5 59.24	2.2144	27 14 35.1	1.358					
8	5 8 12.13	2.2152	27 15 52.6	1.227					
9	5 10 25.07	2.2160	27 17 2.3	1.096					
10	5 12 38.05	2.2167	27 18 4.1	0.964					
11	5 14 51.07	2.2173	27 18 58.0	0.833					
12	5 17 4.12	2.2178	27 19 44.1	0.702					
13	5 19 17.21	2.2184	27 20 22.3	0.571					
14	5 21 30.33	2.2188	27 20 52.6	0.439					
15	5 23 43.47	2.2192	27 21 15.0	0.308					
16	5 25 56.64	2.2196	27 21 29.5	0.176					
17	5 28 9.82	2.2198	27 21 36.1	+0.044					
18	5 30 23.01	2.2200	27 21 34.8	-0.087					
19	5 32 36.22	2.2202	27 21 25.6	0.219					
20	5 34 49.44	2.2203	27 21 8.5	0.351					
21	5 37 2.66	2.2203	27 20 43.5	0.483					
22	5 39 15.88	2.2203	27 20 10.6	0.614					
23	5 41 29.09	2.2202	N. 27 19 29.8	0.746					
THURSDAY 30.									
0	5 43 42.30	2.2201	N. 27 18 41.1	0.878					
1	5 45 55.50	2.2198	27 17 44.4	1.010					
2	5 48 8.68	2.2195	27 16 39.9	1.141					
3	5 50 21.84	2.2192	27 15 27.5	1.273					
4	5 52 34.98	2.2188	27 14 7.2	1.405					
5	5 54 48.09	2.2183	27 12 38.9	1.537					
6	5 57 1.18	2.2179	27 11 2.8	1.668					
7	5 59 14.24	2.2173	27 9 18.8	1.798					
8	6 1 27.26	2.2167	27 7 27.0	1.929					
9	6 3 40.24	2.2160	27 5 27.3	2.061					
10	6 5 53.18	2.2153	27 3 19.7	2.192					
11	6 8 6.07	2.2145	27 1 4.3	2.323					
12	6 10 18.92	2.2137	26 58 41.0	2.453					
13	6 12 31.71	2.2128	26 56 9.9	2.583					
14	6 14 44.45	2.2118	26 53 31.0	2.713					
15	6 16 57.13	2.2108	26 50 44.3	2.843					
16	6 19 9.74	2.2097	26 47 49.8	2.973					
17	6 21 22.29	2.2086	26 44 47.5	3.103					
18	6 23 34.77	2.2074	26 41 37.4	3.233					
19	6 25 47.18	2.2062	26 38 19.6	3.362					
20	6 27 59.51	2.2049	26 34 54.0	3.491					
21	6 30 11.77	2.2037	26 31 20.7	3.619					
22	6 32 23.95	2.2023	26 27 39.7	3.748					
23	6 34 36.04	2.2008	26 23 50.9	3.877					
24	6 36 48.05	2.1994	N. 26 19 54.5	4.004					

PHASES OF THE MOON.

☾	Last Quarter	. . . . .	Sept.	d h m
●	New Moon	. . . . .		8 22 52.7
☾	First Quarter	. . . . .		15 19 21.3
○	Full Moon	. . . . .		22 21 35.2
☾	Last Quarter	. . . . .		30 21 44.3

☾	Apogee	. . . . .	Sept.	d h
☾	Perigee	. . . . .		14 3.3
☾	Apogee	. . . . .		29 4.8

AT GREENWICH APPARENT NOON.

Day of the Week.	Day of the Month.	THE SUN'S						Sidereal Time of Semidiameter Passing Meridian.	Equation of Time, to be Subtracted from Apparent Time.
		Apparent Right Ascension.	Diff. for 1 Hour.	Apparent Declination.	Diff. for 1 Hour.	Semidiameter.			
		h m s	s	° ' "	"	° ' "	s	m s	
Fri.	1	12 26 29.58	9.044	S. 2 51 52.0	-58.31	16 0.55	64.27	10 1.75	
Sat.	2	12 30 6.77	9.056	3 15 10.6	58.24	16 0.82	64.31	10 21.06	
SUN.	3	12 33 44.28	9.069	3 38 27.3	58.15	16 1.09	64.36	10 40.06	
Mon.	4	12 37 22.10	9.084	4 1 41.6	-58.04	16 1.36	64.41	10 58.73	
Tues.	5	12 41 0.28	9.099	4 24 53.2	57.92	16 1.63	64.46	11 17.06	
Wed.	6	12 44 38.83	9.114	4 48 1.7	57.78	16 1.90	64.51	11 35.02	
Thur.	7	12 48 17.76	9.130	5 11 6.7	-57.63	16 2.18	64.57	11 52.60	
Fri.	8	12 51 57.09	9.147	5 34 7.8	57.46	16 2.46	64.63	12 9.77	
Sat.	9	12 55 36.83	9.165	5 57 4.6	57.27	16 2.73	64.69	12 26.53	
SUN.	10	12 59 17.01	9.183	6 19 56.7	-57.06	16 3.01	64.76	12 42.86	
Mon.	11	13 2 57.63	9.202	6 42 43.7	56.84	16 3.29	64.83	12 58.75	
Tues.	12	13 6 38.72	9.222	7 5 25.2	56.61	16 3.57	64.90	13 14.18	
Wed.	13	13 10 20.28	9.242	7 28 0.9	-56.36	16 3.85	64.97	13 29.13	
Thur.	14	13 14 2.33	9.263	7 50 30.3	56.09	16 4.13	65.05	13 43.59	
Fri.	15	13 17 44.90	9.285	8 12 53.0	55.80	16 4.41	65.13	13 57.54	
Sat.	16	13 21 27.98	9.307	8 35 8.7	-55.50	16 4.70	65.21	14 10.97	
SUN.	17	13 25 11.62	9.330	8 57 17.0	55.19	16 4.99	65.29	14 23.86	
Mon.	18	13 28 55.82	9.354	9 19 17.6	54.86	16 5.27	65.38	14 36.18	
Tues.	19	13 32 40.60	9.379	9 41 10.0	-54.51	16 5.54	65.47	14 47.92	
Wed.	20	13 36 25.98	9.404	10 2 54.0	54.15	16 5.81	65.56	14 59.06	
Thur.	21	13 40 11.99	9.430	10 24 29.2	53.77	16 6.08	65.65	15 9.58	
Fri.	22	13 43 58.64	9.457	10 45 55.1	-53.38	16 6.35	65.75	15 19.45	
Sat.	23	13 47 45.95	9.485	11 7 11.4	52.97	16 6.62	65.85	15 28.67	
SUN.	24	13 51 33.95	9.514	11 28 17.8	52.55	16 6.88	65.95	15 37.21	
Mon.	25	13 55 22.64	9.544	11 49 13.9	-52.11	16 7.14	66.05	15 45.06	
Tues.	26	13 59 12.04	9.574	12 9 59.3	51.66	16 7.41	66.15	15 52.18	
Wed.	27	14 3 2.18	9.605	12 30 33.5	51.19	16 7.67	66.26	15 58.58	
Thur.	28	14 6 53.06	9.636	12 50 56.3	-50.70	16 7.93	66.36	16 4.24	
Fri.	29	14 10 44.71	9.668	13 11 7.1	50.20	16 8.18	66.47	16 9.13	
Sat.	30	14 14 37.14	9.701	13 31 5.7	49.68	16 8.43	66.58	16 13.25	
SUN.	31	14 18 30.35	9.734	13 50 51.6	49.14	16 8.67	66.69	16 16.58	
Mon.	32	14 22 24.37	9.768	S.14 10 24.3	-48.58	16 8.92	66.80	16 19.11	

NOTE.—The mean time of semidiameter passing the meridian may be found by subtracting 0°.18 from the time.

The sign — prefixed to the hourly change of declination indicates that south declinations are increasing.

AT GREENWICH MEAN NOON.

H. R.	Day of the Month.	THE SUN'S				Equation of Time, to be Added to Mean Time.	Diff. for 1 Hour.	Sidereal Time, or Right Ascension of Mean Sun.
		Apparent Right Ascension.	Diff. for 1 Hour.	Apparent Declination.	Diff. for 1 Hour.			
		h m s	s	° ' "	"	m s	s	h m s
N.	1	12 26 31.09	9.046	S. 2 52 1.7	-58.33	10 1.89	0.810	12 36 32.98
	2	12 30 8.34	9.058	3 15 20.7	58.25	10 21.20	0.798	12 40 29.53
	3	12 33 45.89	9.071	3 38 37.7	58.16	10 40.20	0.785	12 44 26.09
d.	4	12 37 23.77	9.085	4 1 52.3	-58.05	10 58.87	0.771	12 48 22.64
s.	5	12 41 2.00	9.100	4 25 4.1	57.93	11 17.20	0.756	12 52 19.20
d.	6	12 44 40.59	9.116	4 48 12.9	57.79	11 35.16	0.740	12 56 15.75
ur.	7	12 48 19.56	9.132	5 11 18.1	-57.64	11 52.74	0.724	13 0 12.30
	8	12 51 58.94	9.149	5 34 19.4	57.47	12 9.91	0.707	13 4 8.86
	9	12 55 38.73	9.167	5 57 16.4	57.28	12 26.68	0.689	13 8 5.41
N.	10	12 59 18.96	9.185	6 20 8.8	-57.07	12 43.01	0.671	13 12 1.96
d.	11	1 3 2 59.62	9.204	6 42 56.0	56.85	12 58.89	0.652	13 15 58.52
s.	12	13 6 40.75	9.224	7 5 37.7	56.61	13 14.32	0.633	13 19 55.07
d.	13	13 10 22.36	9.244	7 28 13.5	-56.36	13 29.27	0.613	13 23 51.62
ir.	14	13 14 4.45	9.265	7 50 43.1	56.09	13 43.73	0.592	13 27 48.18
	15	13 17 47.06	9.286	8 13 6.0	55.81	13 57.68	0.570	13 31 44.73
N.	16	13 21 30.18	9.308	8 35 21.8	-55.51	14 11.10	0.548	13 35 41.29
	17	13 25 13.86	9.331	8 57 30.2	55.19	14 23.98	0.525	13 39 37.84
d.	18	13 28 58.09	9.355	9 19 30.9	54.86	14 36.30	0.501	13 43 34.40
s.	19	13 32 42.91	9.380	9 41 23.5	-54.51	14 48.04	0.476	13 47 30.95
d.	20	13 36 28.33	9.406	10 3 7.5	54.14	14 59.17	0.451	13 51 27.50
ir.	21	13 40 14.38	9.432	10 24 42.8	53.76	15 9.68	0.425	13 55 24.06
N.	22	13 44 1.06	9.459	10 46 8.7	-53.38	15 19.56	0.398	13 59 20.61
	23	13 47 48.40	9.487	11 7 25.1	52.98	15 28.77	0.370	14 3 17.17
	24	13 51 36.42	9.515	11 28 31.5	52.55	15 37.30	0.341	14 7 13.72
d.	25	13 55 25.14	9.545	11 49 27.6	-52.11	15 45.14	0.312	14 11 10.28
s.	26	13 59 14.57	9.575	12 10 12.9	51.66	15 52.26	0.282	14 15 6.83
d.	27	14 3 4.74	9.606	12 30 47.2	51.18	15 58.65	0.251	14 19 3.39
ir.	28	14 6 55.65	9.637	12 51 9.8	-50.69	16 4.30	0.219	14 22 59.94
	29	14 10 47.32	9.669	13 11 20.6	50.19	16 9.18	0.187	14 26 56.50
N.	30	14 14 39.76	9.702	13 31 19.1	49.67	16 13.29	0.155	14 30 53.05
	31	14 18 32.99	9.735	13 51 4.9	49.13	16 16.62	0.122	14 34 49.61
1.	32	14 22 27.02	9.768	S. 14 10 37.5	-48.57	16 19.14	0.088	14 38 46.16

NOTE.—The semidiameter for mean noon may be assumed the same as that for apparent noon.
 The sign — prefixed to the hourly change of declination indicates that south declinations are increasing.

Diff. for 1 Hour,
 +0.8565.
 (Table III.)

AT GREENWICH MEAN NOON.

Day of the Month.	Day of the Year.	THE SUN'S					Logarithm of the Radius Vector of the Earth.	Diff. for 1 Hour.	Mean Time Sidereal No.
		True Longitude.		Diff. for 1 Hour.	Latitude.				
		λ	λ'						
		° ' "	' "	"	"			h m	
1	274	187 13 34.0	12 44.8	147.54	+0.27	0.000 4312	-50.8	11 21 3	
2	275	188 12 36.0	11 46.7	147.63	0.17	0.000 3092	50.9	11 17 3	
3	276	189 11 40.3	10 50.9	147.73	+0.05	0.000 1869	51.0	11 13 4	
4	277	190 10 46.9	9 57.4	147.82	-0.08	0.000 0643	-51.2	11 9 4	
5	278	191 9 55.7	9 6.1	147.92	0.22	9.999 9413	51.4	11 5 5	
6	279	192 9 6.8	8 17.1	148.01	0.35	9.999 8178	51.6	11 1 5	
7	280	193 8 20.1	7 30.3	148.10	-0.45	9.999 6937	-51.8	10 57 5	
8	281	194 7 35.6	6 45.6	148.19	0.53	9.999 5691	52.0	10 54	
9	282	195 6 53.1	6 3.0	148.27	0.59	9.999 4439	52.3	10 50	
10	283	196 6 12.6	5 22.5	148.35	-0.63	9.999 3182	-52.5	10 46 1	
11	284	197 5 34.1	4 43.8	148.43	0.64	9.999 1919	52.7	10 42 1	
12	285	198 4 57.4	4 7.0	148.51	0.61	9.999 0653	52.8	10 38 2	
13	286	199 4 22.5	3 32.0	148.59	-0.55	9.998 9384	-52.9	10 34 2	
14	287	200 3 49.4	2 58.8	148.66	0.46	9.998 8115	52.9	10 30 2	
15	288	201 3 18.0	2 27.3	148.73	0.34	9.998 6847	52.8	10 26 3	
16	289	202 2 48.4	1 57.5	148.80	-0.21	9.998 5582	-52.6	10 22 3	
17	290	203 2 20.4	1 29.4	148.87	-0.08	9.998 4322	52.4	10 18 4	
18	291	204 1 54.2	1 3.1	148.95	+0.05	9.998 3068	52.1	10 14 4	
19	292	205 1 29.8	0 38.6	149.02	+0.18	9.998 1823	-51.7	10 10 4	
20	293	206 1 7.2	0 15.8	149.10	0.29	9.998 0587	51.3	10 6 5	
21	294	206 60 46.4	59 55.0	149.18	0.37	9.997 9361	50.8	10 2 5	
22	295	207 60 27.6	59 36.0	149.26	+0.43	9.997 8146	-50.3	9 59	
23	296	208 60 10.8	59 19.0	149.34	0.47	9.997 6943	49.9	9 55	
24	297	209 59 55.9	59 4.1	149.42	0.48	9.997 5752	49.4	9 51	
25	298	210 59 43.1	58 51.2	149.51	+0.46	9.997 4572	-48.9	9 47 1	
26	299	211 59 32.4	58 40.3	149.60	0.42	9.997 3404	48.4	9 43 1	
27	300	212 59 23.8	58 31.6	149.69	0.36	9.997 2248	48.0	9 39 2	
28	301	213 59 17.4	58 25.0	149.78	+0.27	9.997 1102	-47.5	9 35 2	
29	302	214 59 13.0	58 20.5	149.87	0.17	9.996 9968	47.1	9 31 2	
30	303	215 59 10.9	58 18.3	149.96	+0.06	9.996 8844	46.7	9 27 3	
31	304	216 59 10.9	58 18.2	150.05	-0.07	9.996 7729	46.3	9 23 3	
32	305	217 59 13.1	58 20.2	150.14	-0.20	9.996 6623	-45.9	9 19 4	

NOTE.—The longitudes in the column λ are referred to the true equinox of their own date, while those in the column λ' are referred to the mean equinox of the beginning of the Besselian fictitious year.

Diff. for 1 H
—9.839
(Table I)

GREENWICH MEAN TIME.

THE MOON'S

DIAMETER.		HORIZONTAL PARALLAX.				UPPER TRANSIT.		AGE.
	Midnight.	Noon.	Diff. for 1 Hour.	Midnight.	Diff. for 1 Hour.	Meridian of Greenwich.	Diff. for 1 Hour.	Noon.
	' "	' "	"	' "	"	h m	m	d
.1	14 55.0	54 28.20	+0.777	54 38.81	+0.990	18 37.9	2.07	22.0
.6	15 2.8	54 51.94	1.196	55 7.46	1.388	19 26.8	2.01	23.0
.6	15 13.0	55 25.19	1.564	55 44.92	1.720	20 14.3	1.95	24.0
.9	15 25.1	56 6.38	+1.851	56 29.23	+1.951	21 0.5	1.91	25.0
.6	15 38.2	56 53.08	2.018	57 17.51	2.047	21 46.3	1.91	26.0
.9	15 51.5	57 42.04	2.034	58 6.15	1.978	22 32.5	1.95	27.0
.8	16 3.7	58 29.33	+1.878	58 51.06	+1.736	23 20.2	2.04	28.0
.1	16 13.8	59 10.84	1.554	59 28.21	1.336	6	.	29.0
.8	16 21.0	59 42.80	1.091	59 54.32	0.826	0 10.7	2.18	0.6
.2	16 24.6	60 2.59	+0.550	60 7.52	+0.272	1 5.0	2.35	1.6
.0	16 24.6	60 9.15	+0.002	60 7.63	-0.251	2 3.5	2.52	2.6
.4	16 21.5	60 3.20	-0.483	59 56.13	0.691	3 5.6	2.63	3.6
.9	16 15.8	59 46.74	-0.868	59 35.43	-1.012	4 9.2	2.64	4.6
.3	16 8.5	59 22.56	1.128	59 8.47	1.215	5 11.6	2.54	5.6
.4	16 0.2	58 53.49	1.277	58 37.90	1.317	6 10.6	2.37	6.6
.8	15 51.4	58 21.95	-1.339	58 5.81	-1.349	7 5.0	2.18	7.6
.0	15 42.6	57 49.63	1.346	57 33.55	1.333	7 55.1	2.00	8.6
.3	15 34.0	57 17.65	1.317	57 1.96	1.298	8 41.7	1.88	9.6
.8	15 25.6	56 46.50	-1.277	56 31.32	-1.252	9 26.0	1.81	10.6
.6	15 17.6	56 16.46	1.224	56 1.95	1.194	10 9.2	1.79	11.6
.8	15 10.1	55 47.81	1.162	55 34.09	1.123	10 52.3	1.81	12.6
.5	15 3.0	55 20.88	-1.077	55 8.27	-1.023	11 36.3	1.86	13.6
.8	14 56.8	54 56.37	0.959	54 45.29	0.885	12 21.9	1.94	14.6
.0	14 51.6	54 35.19	0.797	54 26.22	0.696	13 9.4	2.02	15.6
.5	14 47.8	54 18.53	-0.582	54 12.30	-0.454	13 58.7	2.08	16.6
.5	14 45.8	54 7.70	-0.311	54 4.90	-0.155	14 49.3	2.12	17.6
.5	14 45.9	54 4.04	+0.014	54 5.28	+0.195	15 40.1	2.10	18.6
.8	14 48.4	54 8.75	+0.385	54 14.56	+0.585	16 30.2	2.06	19.6
.6	14 53.6	54 22.81	0.791	54 33.55	1.000	17 18.9	2.00	20.6
.2	15 1.5	54 46.80	1.208	55 2.54	1.414	18 6.0	1.92	21.6
.4	15 12.0	55 20.71	1.612	55 41.19	1.799	18 51.5	1.88	22.6
.2	15 24.8	56 3.82	+1.969	56 28.35	+2.115	19 36.3	1.86	23.6

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	D f r
FRIDAY 1.					SUNDAY 3.				
0	h m s	s	° ' "	"	0	h m s	s	° ' "	"
0	6 36 48.05	2.1994	N. 26 19 54.5	4.004	0	8 20 3.70	2.0960	N. 20 47 39.8	5
1	6 38 59.97	2.1979	26 15 50.4	4.132	1	8 22 9.39	2.0937	20 37 57.3	5
2	6 41 11.80	2.1963	26 11 38.7	4.259	2	8 24 14.94	2.0913	20 28 8.6	5
3	6 43 23.53	2.1947	26 7 19.3	4.386	3	8 26 20.35	2.0890	20 18 13.6	5
4	6 45 35.16	2.1931	26 2 52.4	4.513	4	8 28 25.62	2.0867	20 8 12.4	5
5	6 47 46.70	2.1914	25 58 17.8	4.639	5	8 30 30.75	2.0843	19 58 5.1	5
6	6 49 58.13	2.1897	25 53 35.7	4.765	6	8 32 35.74	2.0820	19 47 51.7	5
7	6 52 9.46	2.1879	25 48 46.0	4.892	7	8 34 40.59	2.0798	19 37 32.2	5
8	6 54 20.68	2.1862	25 43 48.7	5.017	8	8 36 45.31	2.0775	19 27 6.7	5
9	6 56 31.80	2.1843	25 38 44.0	5.141	9	8 38 49.89	2.0753	19 16 35.3	5
10	6 58 42.80	2.1824	25 33 31.8	5.266	10	8 40 54.34	2.0731	19 5 57.9	5
11	7 0 53.69	2.1805	25 28 12.1	5.391	11	8 42 58.66	2.0709	18 55 14.5	5
12	7 3 4.46	2.1786	25 22 44.9	5.515	12	8 45 2.85	2.0688	18 44 25.3	5
13	7 5 15.12	2.1767	25 17 10.3	5.638	13	8 47 6.91	2.0666	18 33 30.3	5
14	7 7 25.66	2.1746	25 11 28.4	5.760	14	8 49 10.84	2.0644	18 22 29.5	5
15	7 9 36.07	2.1725	25 5 39.1	5.883	15	8 51 14.64	2.0623	18 11 23.0	5
16	7 11 46.36	2.1705	24 59 42.4	6.006	16	8 53 18.32	2.0603	18 0 10.8	5
17	7 13 56.53	2.1684	24 53 38.4	6.127	17	8 55 21.88	2.0583	17 48 52.9	5
18	7 16 6.57	2.1663	24 47 27.1	6.248	18	8 57 25.31	2.0562	17 37 29.4	5
19	7 18 16.49	2.1642	24 41 8.6	6.369	19	8 59 28.62	2.0543	17 26 0.4	5
20	7 20 26.27	2.1619	24 34 42.8	6.490	20	9 1 31.82	2.0523	17 14 25.8	5
21	7 22 35.92	2.1598	24 28 9.8	6.611	21	9 3 34.90	2.0504	17 2 45.8	5
22	7 24 45.44	2.1576	24 21 29.5	6.731	22	9 5 37.87	2.0485	16 51 0.3	5
23	7 26 54.83	2.1553	N. 24 14 42.1	6.849	23	9 7 40.72	2.0466	N. 16 39 9.5	5
SATURDAY 2.					MONDAY 4.				
0	7 29 4.08	2.1531	N. 24 7 47.6	6.968	0	9 9 43.46	2.0448	N. 16 27 13.3	5
1	7 31 13.20	2.1508	24 0 46.0	7.086	1	9 11 46.09	2.0430	16 15 11.8	5
2	7 33 22.18	2.1485	23 53 37.3	7.204	2	9 13 48.62	2.0413	16 3 5.1	5
3	7 35 31.02	2.1462	23 46 21.5	7.322	3	9 15 51.05	2.0397	15 50 53.2	5
4	7 37 39.72	2.1438	23 38 58.7	7.438	4	9 17 53.38	2.0380	15 38 36.1	5
5	7 39 48.28	2.1415	23 31 28.9	7.554	5	9 19 55.61	2.0363	15 26 13.9	5
6	7 41 56.70	2.1392	23 23 52.2	7.669	6	9 21 57.74	2.0347	15 13 46.6	5
7	7 44 4.98	2.1368	23 16 8.6	7.784	7	9 23 59.78	2.0332	15 1 14.3	5
8	7 46 13.11	2.1343	23 8 18.1	7.899	8	9 26 1.72	2.0317	14 48 37.1	5
9	7 48 21.10	2.1320	23 0 20.7	8.013	9	9 28 3.58	2.0302	14 35 54.9	5
10	7 50 28.95	2.1297	22 52 16.5	8.127	10	9 30 5.35	2.0288	14 23 7.9	5
11	7 52 36.66	2.1273	22 44 5.5	8.240	11	9 32 7.04	2.0275	14 10 16.1	5
12	7 54 44.22	2.1248	22 35 47.7	8.352	12	9 34 8.65	2.0262	13 57 19.5	5
13	7 56 51.64	2.1224	22 27 23.2	8.464	13	9 36 10.18	2.0249	13 44 18.2	5
14	7 58 58.91	2.1200	22 18 52.0	8.575	14	9 38 11.64	2.0237	13 31 12.2	5
15	8 1 6.04	2.1176	22 10 14.2	8.686	15	9 40 13.02	2.0224	13 18 1.6	5
16	8 3 13.02	2.1152	22 1 29.7	8.796	16	9 42 14.33	2.0213	13 4 46.4	5
17	8 5 19.86	2.1128	21 52 38.7	8.905	17	9 44 15.58	2.0203	12 51 26.7	5
18	8 7 26.56	2.1104	21 43 41.1	9.014	18	9 46 16.77	2.0193	12 38 2.5	5
19	8 9 33.11	2.1080	21 34 37.0	9.123	19	9 48 17.89	2.0183	12 24 33.9	5
20	8 11 39.52	2.1056	21 25 26.4	9.231	20	9 50 18.96	2.0174	12 11 0.9	5
21	8 13 45.78	2.1032	21 16 9.3	9.338	21	9 52 19.98	2.0165	11 57 23.7	5
22	8 15 51.90	2.1007	21 6 45.9	9.444	22	9 54 20.94	2.0156	11 43 42.2	5
23	8 17 57.87	2.0983	20 57 16.0	9.551	23	9 56 21.85	2.0148	11 29 56.5	5
24	8 20 3.70	2.0960	N. 20 47 39.8	9.656	24	9 58 22.72	2.0142	N. 11 16 6.6	5

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
TUESDAY 5.					THURSDAY 7.				
0	h m s	s	° ' "	"	0	h m s	s	° ' "	"
0	9 58 22.72	2.0142	N. 11 16 6.6	13.865	0	11 35 25.30	2.0556	S. 0 49 5.0	15.915
1	10 0 23.55	2.0135	11 2 12.7	13.932	1	11 37 28.71	2.0582	1 5 0.3	15.928
2	10 2 24.34	2.0129	10 48 14.7	13.999	2	11 39 32.28	2.0609	1 20 56.4	15.940
3	10 4 25.10	2.0123	10 34 12.8	14.065	3	11 41 36.02	2.0637	1 36 53.1	15.949
4	10 6 25.82	2.0118	10 20 6.9	14.130	4	11 43 39.92	2.0665	1 52 50.3	15.958
5	10 8 26.52	2.0114	10 5 57.2	14.193	5	11 45 44.00	2.0695	2 8 48.0	15.965
6	10 10 27.19	2.0110	9 51 43.7	14.257	6	11 47 48.26	2.0725	2 24 46.1	15.971
7	10 12 27.84	2.0108	9 37 26.4	14.318	7	11 49 52.70	2.0755	2 40 44.5	15.975
8	10 14 28.48	2.0105	9 23 5.5	14.379	8	11 51 57.32	2.0786	2 56 43.1	15.978
9	10 16 29.10	2.0103	9 8 40.9	14.440	9	11 54 2.13	2.0818	3 12 41.8	15.979
10	10 18 29.71	2.0102	8 54 12.7	14.499	10	11 56 7.14	2.0852	3 28 40.6	15.979
11	10 20 30.32	2.0102	8 39 41.0	14.557	11	11 58 12.35	2.0886	3 44 39.3	15.977
12	10 22 30.93	2.0102	8 25 5.9	14.613	12	12 0 17.77	2.0920	4 0 37.8	15.973
13	10 24 31.54	2.0102	8 10 27.4	14.670	13	12 2 23.39	2.0955	4 16 36.1	15.968
14	10 26 32.15	2.0103	7 55 45.5	14.725	14	12 4 29.23	2.0992	4 32 34.0	15.962
15	10 28 32.78	2.0106	7 41 0.4	14.778	15	12 6 35.29	2.1028	4 48 31.5	15.954
16	10 30 33.42	2.0108	7 26 12.1	14.832	16	12 8 41.57	2.1066	5 4 28.5	15.944
17	10 32 34.07	2.0111	7 11 20.6	14.883	17	12 10 48.08	2.1104	5 20 24.8	15.933
18	10 34 34.75	2.0115	6 56 26.1	14.934	18	12 12 54.82	2.1143	5 36 20.4	15.920
19	10 36 35.45	2.0119	6 41 28.5	14.985	19	12 15 1.80	2.1183	5 52 15.2	15.906
20	10 38 36.18	2.0124	6 26 27.9	15.033	20	12 17 9.02	2.1224	6 8 9.1	15.890
21	10 40 36.94	2.0130	6 11 24.5	15.081	21	12 19 16.49	2.1266	6 24 2.0	15.873
22	10 42 37.74	2.0137	5 56 18.2	15.128	22	12 21 24.21	2.1308	6 39 53.8	15.853
23	10 44 38.58	2.0143	N. 5 41 9.2	15.173	23	12 23 32.18	2.1350	S. 6 55 44.4	15.832
WEDNESDAY 6.					FRIDAY 8.				
0	h m s	s	° ' "	"	0	h m s	s	° ' "	"
0	10 46 39.46	2.0151	N. 5 25 57.5	15.217	0	12 25 40.41	2.1394	S. 7 11 33.6	15.808
1	10 48 40.39	2.0160	5 10 43.2	15.260	1	12 27 48.91	2.1438	7 27 21.4	15.784
2	10 50 41.38	2.0170	4 55 26.3	15.302	2	12 29 57.67	2.1483	7 43 7.7	15.758
3	10 52 42.43	2.0180	4 40 7.0	15.343	3	12 32 6.70	2.1529	7 58 52.4	15.731
4	10 54 43.54	2.0190	4 24 45.2	15.383	4	12 34 16.02	2.1576	8 14 35.4	15.702
5	10 56 44.71	2.0201	4 9 21.1	15.421	5	12 36 25.61	2.1623	8 30 16.6	15.671
6	10 58 45.95	2.0213	3 53 54.7	15.458	6	12 38 35.49	2.1671	8 45 55.9	15.638
7	11 0 47.27	2.0226	3 38 26.1	15.494	7	12 40 45.66	2.1719	9 1 33.1	15.603
8	11 2 48.66	2.0239	3 22 55.4	15.529	8	12 42 56.12	2.1768	9 17 8.2	15.566
9	11 4 50.14	2.0254	3 7 22.6	15.563	9	12 45 6.88	2.1818	9 32 41.0	15.528
10	11 6 51.71	2.0269	2 51 47.8	15.596	10	12 47 17.94	2.1869	9 48 11.5	15.488
11	11 8 53.37	2.0284	2 36 11.1	15.627	11	12 49 29.31	2.1921	10 3 39.5	15.445
12	11 10 55.12	2.0301	2 20 32.6	15.657	12	12 51 40.99	2.1973	10 19 4.9	15.402
13	11 12 56.98	2.0318	2 4 52.3	15.686	13	12 53 52.98	2.2025	10 34 27.7	15.357
14	11 14 58.94	2.0336	1 49 10.3	15.713	14	12 56 5.29	2.2078	10 49 47.7	15.309
15	11 17 1.01	2.0354	1 33 26.7	15.739	15	12 58 17.92	2.2133	11 5 4.8	15.260
16	11 19 3.19	2.0373	1 17 41.6	15.764	16	13 0 30.88	2.2188	11 20 18.9	15.209
17	11 21 5.49	2.0394	1 1 55.0	15.788	17	13 2 44.17	2.2243	11 35 29.9	15.156
18	11 23 7.92	2.0415	0 46 7.1	15.809	18	13 4 57.79	2.2298	11 50 37.6	15.101
19	11 25 10.47	2.0436	0 30 17.9	15.831	19	13 7 11.75	2.2355	12 5 42.0	15.045
20	11 27 13.15	2.0458	N. 0 14 27.4	15.851	20	13 9 26.05	2.2412	12 20 43.0	14.987
21	11 29 15.97	2.0482	S. 0 1 24.2	15.869	21	13 11 40.69	2.2469	12 35 40.4	14.927
22	11 31 18.93	2.0506	0 17 16.9	15.886	22	13 13 55.08	2.2527	12 50 34.2	14.864
23	11 33 22.04	2.0531	0 33 10.5	15.901	23	13 16 11.02	2.2586	13 5 24.1	14.799
24	11 35 25.30	2.0556	S. 0 49 5.0	15.915	24	13 18 26.71	2.2645	S. 13 20 10.1	14.733

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	
SATURDAY 9.					MONDAY 11.				
0	h m s	s	° ' "	"	0	h m s	s	° ' "	
0	13 18 26.71	2.2645	S. 13 20 10.1	14.733	0	15 14 30.93	2.5713	S. 23 14 16.0	
1	13 20 42.76	2.2705	13 34 52.1	14.666	1	15 17 5.38	2.5771	23 23 28.3	
2	13 22 59.17	2.2765	13 49 30.0	14.596	2	15 19 40.18	2.5828	23 32 31.0	
3	13 25 15.94	2.2825	14 4 3.6	14.524	3	15 22 15.31	2.5883	23 41 24.1	
4	13 27 33.07	2.2886	14 18 32.9	14.451	4	15 24 50.77	2.5938	23 50 7.4	
5	13 29 50.57	2.2948	14 32 57.7	14.375	5	15 27 26.56	2.5993	23 58 40.9	
6	13 32 8.45	2.3011	14 47 17.9	14.297	6	15 30 2.68	2.6046	24 7 4.4	
7	13 34 26.70	2.3073	15 1 33.3	14.217	7	15 32 39.11	2.6098	24 15 17.9	
8	13 36 45.33	2.3136	15 15 43.9	14.136	8	15 35 15.85	2.6149	24 23 21.3	
9	13 39 4.33	2.3199	15 29 49.6	14.053	9	15 37 52.90	2.6200	24 31 14.5	
10	13 41 23.72	2.3263	15 43 50.2	13.967	10	15 40 30.25	2.6248	24 38 57.4	
11	13 43 43.49	2.3327	15 57 45.6	13.879	11	15 43 7.88	2.6296	24 46 30.0	
12	13 46 3.64	2.3391	16 11 35.7	13.790	12	15 45 45.80	2.6343	24 53 52.1	
13	13 48 24.18	2.3456	16 25 20.4	13.698	13	15 48 24.00	2.6389	25 1 3.7	
14	13 50 45.11	2.3521	16 38 59.5	13.605	14	15 51 2.47	2.6433	25 8 4.7	
15	13 53 6.43	2.3586	16 52 33.0	13.510	15	15 53 41.20	2.6477	25 14 55.0	
16	13 55 28.14	2.3652	17 6 0.7	13.413	16	15 56 20.19	2.6519	25 21 34.6	
17	13 57 50.25	2.3718	17 19 22.5	13.313	17	15 58 59.43	2.6559	25 28 3.4	
18	14 0 12.75	2.3783	17 32 38.3	13.212	18	16 1 38.90	2.6598	25 34 21.3	
19	14 2 35.65	2.3849	17 45 47.9	13.108	19	16 4 18.60	2.6636	25 40 28.2	
20	14 4 58.94	2.3915	17 58 51.3	13.003	20	16 6 58.53	2.6673	25 46 24.2	
21	14 7 22.63	2.3982	18 11 48.3	12.896	21	16 9 38.68	2.6708	25 52 9.1	
22	14 9 46.72	2.4048	18 24 38.8	12.787	22	16 12 19.03	2.6742	25 57 42.9	
23	14 12 11.21	2.4115	S. 18 37 22.7	12.675	23	16 14 59.58	2.6773	S. 26 3 5.5	
SUNDAY 10.					TUESDAY 12.				
0	h m s	s	° ' "	"	0	h m s	s	° ' "	
0	14 14 36.10	2.4181	S. 18 49 59.8	12.562	0	16 17 40.31	2.6803	S. 26 8 16.9	
1	14 17 1.38	2.4248	19 2 30.1	12.448	1	16 20 21.22	2.6833	26 13 17.0	
2	14 19 27.07	2.4315	19 14 53.5	12.331	2	16 23 2.31	2.6861	26 18 5.8	
3	14 21 53.16	2.4381	19 27 9.8	12.212	3	16 25 43.55	2.6887	26 22 43.2	
4	14 24 19.64	2.4447	19 39 18.9	12.091	4	16 28 24.95	2.6912	26 27 9.2	
5	14 26 46.52	2.4513	19 51 20.7	11.968	5	16 31 6.49	2.6934	26 31 23.7	
6	14 29 13.80	2.4580	20 3 15.0	11.843	6	16 33 48.16	2.6955	26 35 26.8	
7	14 31 41.48	2.4646	20 15 1.8	11.717	7	16 36 29.95	2.6974	26 39 18.3	
8	14 34 9.55	2.4712	20 26 41.0	11.588	8	16 39 11.85	2.6992	26 42 58.2	
9	14 36 38.02	2.4778	20 38 12.4	11.458	9	16 41 53.85	2.7008	26 46 26.6	
10	14 39 6.88	2.4843	20 49 35.9	11.325	10	16 44 35.94	2.7023	26 49 43.4	
11	14 41 36.13	2.4908	21 0 51.4	11.191	11	16 47 18.12	2.7036	26 52 48.5	
12	14 44 5.77	2.4973	21 11 58.8	11.055	12	16 50 0.37	2.7047	26 55 41.9	
13	14 46 35.80	2.5037	21 22 58.0	10.917	13	16 52 42.68	2.7056	26 58 23.6	
14	14 49 6.21	2.5101	21 33 48.8	10.777	14	16 55 25.04	2.7063	27 0 53.6	
15	14 51 37.01	2.5165	21 44 31.2	10.636	15	16 58 7.44	2.7068	27 3 11.9	
16	14 54 8.19	2.5228	21 55 5.1	10.493	16	17 0 49.86	2.7072	27 5 18.5	
17	14 56 39.75	2.5291	22 5 30.3	10.348	17	17 3 32.30	2.7075	27 7 13.4	
18	14 59 11.68	2.5353	22 15 46.8	10.201	18	17 6 14.76	2.7076	27 8 56.5	
19	15 1 43.98	2.5414	22 25 54.4	10.052	19	17 8 57.21	2.7074	27 10 27.8	
20	15 4 16.65	2.5476	22 35 53.1	9.902	20	17 11 39.65	2.7072	27 11 47.4	
21	15 6 49.69	2.5536	22 45 42.7	9.750	21	17 14 22.07	2.7067	27 12 55.2	
22	15 9 23.08	2.5595	22 55 23.1	9.596	22	17 17 4.45	2.7059	27 13 51.3	
23	15 11 56.83	2.5654	23 4 54.2	9.441	23	17 19 46.78	2.7051	27 14 35.7	
24	15 14 30.93	2.5713	S. 23 14 16.0	9.284	24	17 22 29.06	2.7041	S. 27 15 8.3	

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
WEDNESDAY 13.					FRIDAY 15.				
0	17 22 29.06	2.7041	S. 27 15 8.3	0.446	0	19 28 8.65	2.4841	S. 24 4 27.3	7.974
1	17 25 11.27	2.7028	27 15 20.2	0.251	1	19 30 37.40	2.4771	23 56 24.5	8.118
2	17 27 53.40	2.7015	27 15 38.4	-0.056	2	19 33 5.90	2.4701	23 48 13.1	8.261
3	17 30 35.45	2.7000	27 15 35.9	+0.138	3	19 35 33.90	2.4631	23 39 53.2	8.402
4	17 33 17.40	2.6983	27 15 21.8	0.332	4	19 38 1.47	2.4560	23 31 24.9	8.541
5	17 35 59.24	2.6963	27 14 56.1	0.526	5	19 40 28.62	2.4489	23 22 48.3	8.678
6	17 38 40.96	2.6943	27 14 18.7	0.720	6	19 42 55.34	2.4417	23 14 3.6	8.813
7	17 41 22.56	2.6921	27 13 29.7	0.913	7	19 45 21.62	2.4345	23 5 10.7	8.948
8	17 44 4.01	2.6897	27 12 29.2	1.104	8	19 47 47.48	2.4273	22 56 9.8	9.080
9	17 46 45.32	2.6872	27 11 17.2	1.296	9	19 50 12.90	2.4201	22 47 1.1	9.211
10	17 49 26.47	2.6844	27 9 53.7	1.488	10	19 52 37.89	2.4129	22 37 44.5	9.341
11	17 52 7.45	2.6815	27 8 18.7	1.678	11	19 55 2.45	2.4057	22 28 20.2	9.468
12	17 54 48.25	2.6784	27 6 32.3	1.868	12	19 57 26.57	2.3983	22 18 48.3	9.594
13	17 57 28.86	2.6752	27 4 34.6	2.057	13	19 59 50.25	2.3911	22 9 8.9	9.718
14	18 0 9.27	2.6718	27 2 25.5	2.246	14	20 2 13.50	2.3839	21 59 22.1	9.841
15	18 2 49.48	2.6683	27 0 5.1	2.433	15	20 4 36.32	2.3767	21 49 28.0	9.962
16	18 5 29.47	2.6646	26 57 33.5	2.619	16	20 6 58.70	2.3693	21 39 26.7	10.081
17	18 8 9.23	2.6608	26 54 50.8	2.805	17	20 9 20.64	2.3621	21 29 18.3	10.199
18	18 10 48.76	2.6568	26 51 56.9	2.990	18	20 11 42.15	2.3549	21 19 2.8	10.316
19	18 13 28.04	2.6526	26 48 52.0	3.174	19	20 14 3.23	2.3477	21 8 40.4	10.430
20	18 16 7.07	2.6484	26 45 36.0	3.357	20	20 16 23.87	2.3404	20 58 11.2	10.543
21	18 18 45.85	2.6441	26 42 9.1	3.539	21	20 18 44.08	2.3332	20 47 35.3	10.654
22	18 21 24.36	2.6395	26 38 31.3	3.720	22	20 21 3.85	2.3260	20 36 52.7	10.763
23	18 24 2.59	2.6348	S. 26 34 42.7	3.900	23	20 23 23.20	2.3188	S. 20 26 3.7	10.871
THURSDAY 14.					SATURDAY 16.				
0	18 26 40.53	2.6299	S. 26 30 43.3	4.079	0	20 25 42.11	2.3116	S. 20 15 8.2	10.978
1	18 29 18.18	2.6250	26 26 33.2	4.257	1	20 28 0.59	2.3045	20 4 6.4	11.082
2	18 31 55.53	2.6199	26 22 12.5	4.433	2	20 30 18.65	2.2975	19 52 58.4	11.185
3	18 34 32.57	2.6148	26 17 41.3	4.608	3	20 32 36.29	2.2904	19 41 44.2	11.287
4	18 37 9.30	2.6095	26 12 59.6	4.783	4	20 34 53.50	2.2833	19 30 24.0	11.386
5	18 39 45.71	2.6041	26 8 7.4	4.956	5	20 37 10.29	2.2763	19 18 57.9	11.484
6	18 42 21.79	2.5986	26 3 4.9	5.127	6	20 39 26.66	2.2693	19 7 25.9	11.581
7	18 44 57.54	2.5929	25 57 52.2	5.297	7	20 41 42.61	2.2623	18 55 48.2	11.676
8	18 47 32.94	2.5872	25 52 29.3	5.466	8	20 43 58.14	2.2554	18 44 4.8	11.769
9	18 50 8.00	2.5814	25 46 56.3	5.633	9	20 46 13.26	2.2486	18 32 15.9	11.861
10	18 52 42.71	2.5755	25 41 13.3	5.800	10	20 48 27.97	2.2418	18 20 21.5	11.952
11	18 55 17.06	2.5694	25 35 20.3	5.965	11	20 50 42.28	2.2351	18 8 21.7	12.040
12	18 57 51.04	2.5633	25 29 17.5	6.128	12	20 52 56.18	2.2283	17 56 16.7	12.127
13	19 0 24.65	2.5571	25 23 4.9	6.290	13	20 55 9.68	2.2216	17 44 6.5	12.213
14	19 2 57.89	2.5508	25 16 42.7	6.451	14	20 57 22.77	2.2149	17 31 51.2	12.297
15	19 5 30.74	2.5443	25 10 10.8	6.610	15	20 59 35.47	2.2084	17 19 30.9	12.378
16	19 8 3.21	2.5379	25 3 29.5	6.768	16	21 1 47.78	2.2018	17 7 5.8	12.459
17	19 10 35.29	2.5314	24 56 38.7	6.924	17	21 3 59.69	2.1953	16 54 35.8	12.539
18	19 13 6.98	2.5248	24 49 38.6	7.078	18	21 6 11.22	2.1890	16 42 1.1	12.617
19	19 15 38.27	2.5182	24 42 29.3	7.232	19	21 8 22.37	2.1826	16 29 21.8	12.693
20	19 18 9.16	2.5115	24 35 10.8	7.383	20	21 10 33.13	2.1763	16 16 38.0	12.768
21	19 20 39.65	2.5048	24 27 43.3	7.533	21	21 12 43.52	2.1701	16 3 49.7	12.841
22	19 23 9.73	2.4979	24 20 6.8	7.682	22	21 14 53.54	2.1638	15 50 57.1	12.913
23	19 25 39.40	2.4910	24 12 21.4	7.829	23	21 17 3.18	2.1577	15 38 0.2	12.983
24	19 28 8.65	2.4841	S. 24 4 27.3	7.974	24	21 19 12.46	2.1517	S. 15 24 59.1	13.052

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.
SUNDAY 17.					TUESDAY 19.			
0	h m s	s	° ' "	"	0	h m s	s	° ' "
0	21 19 12.46	2.1517	S. 15 24 59.1	13.052	0	22 56 40.52	1.9446	S. 4 5 2.8
1	21 21 21.38	2.1457	15 11 54.0	13.119	1	22 58 46.12	1.9422	3 50 15.0
2	21 23 20.94	2.1397	14 58 44.8	13.186	2	23 0 42.58	1.9398	3 35 26.8
3	21 25 38.14	2.1338	14 45 31.7	13.250	3	23 2 38.90	1.9375	3 20 38.3
4	21 27 45.99	2.1280	14 32 14.8	13.313	4	23 4 35.08	1.9353	3 5 49.5
5	21 29 53.50	2.1223	14 18 54.2	13.374	5	23 6 31.13	1.9331	2 51 0.6
6	21 32 0.66	2.1165	14 5 29.9	13.435	6	23 8 27.05	1.9310	2 36 11.6
7	21 34 7.48	2.1109	13 52 2.0	13.493	7	23 10 22.85	1.9291	2 21 22.5
8	21 36 13.97	2.1054	13 38 30.7	13.551	8	23 12 18.54	1.9272	2 6 33.3
9	21 38 20.13	2.0999	13 24 55.9	13.608	9	23 14 14.11	1.9253	1 51 44.3
10	21 40 25.96	2.0945	13 11 17.8	13.662	10	23 16 9.58	1.9236	1 36 55.4
11	21 42 31.47	2.0892	12 57 36.5	13.715	11	23 18 4.94	1.9218	1 22 6.7
12	21 44 36.66	2.0839	12 43 52.0	13.767	12	23 20 0.20	1.9202	1 7 18.2
13	21 46 41.54	2.0788	12 30 4.4	13.817	13	23 21 55.36	1.9187	0 52 30.1
14	21 48 46.11	2.0736	12 16 13.9	13.866	14	23 23 50.44	1.9172	0 37 42.4
15	21 50 50.37	2.0685	12 2 20.5	13.914	15	23 25 45.43	1.9158	0 22 55.1
16	21 52 54.33	2.0636	11 48 24.2	13.962	16	23 27 40.34	1.9145	S. 0 8 8.3
17	21 54 58.00	2.0587	11 34 25.1	14.007	17	23 29 35.17	1.9133	N. 0 6 37.9
18	21 57 1.37	2.0538	11 20 23.4	14.050	18	23 31 29.93	1.9121	0 21 23.5
19	21 59 4.46	2.0491	11 6 19.1	14.092	19	23 33 24.62	1.9109	0 36 8.4
20	22 1 7.26	2.0444	10 52 12.3	14.134	20	23 35 19.24	1.9098	0 50 52.5
21	22 3 9.79	2.0398	10 38 3.0	14.175	21	23 37 13.80	1.9089	1 5 35.8
22	22 5 12.04	2.0353	10 23 51.3	14.213	22	23 39 8.31	1.9081	1 20 18.3
23	22 7 14.02	2.0308	S. 10 9 37.4	14.250	23	23 41 2.77	1.9073	N. 1 34 59.8
MONDAY 18.					WEDNESDAY 20.			
0	h m s	s	° ' "	"	0	h m s	s	° ' "
0	22 9 15.74	2.0265	S. 9 55 21.3	14.286	0	23 42 57.18	1.9065	N. 1 49 40.4
1	22 11 17.20	2.0222	9 41 3.1	14.321	1	23 44 51.55	1.9058	2 4 19.9
2	22 13 18.40	2.0179	9 26 42.8	14.355	2	23 46 45.88	1.9052	2 18 58.3
3	22 15 19.35	2.0138	9 12 20.5	14.387	3	23 48 40.17	1.9046	2 33 35.5
4	22 17 20.05	2.0097	8 57 56.3	14.418	4	23 50 34.43	1.9042	2 48 11.4
5	22 19 20.51	2.0057	8 43 30.3	14.448	5	23 52 28.67	1.9038	3 2 46.1
6	22 21 20.74	2.0018	8 29 2.5	14.477	6	23 54 22.88	1.9034	3 17 19.4
7	22 23 20.73	1.9979	8 14 33.1	14.504	7	23 56 17.08	1.9032	3 31 51.3
8	22 25 20.49	1.9942	8 0 2.0	14.531	8	23 58 11.26	1.9029	3 46 21.8
9	22 27 20.03	1.9905	7 45 29.4	14.556	9	0 0 5.43	1.9028	4 0 50.7
10	22 29 19.35	1.9869	7 30 55.3	14.580	10	0 1 59.59	1.9027	4 15 18.1
11	22 31 18.46	1.9834	7 16 19.8	14.603	11	0 3 53.75	1.9027	4 29 43.8
12	22 33 17.36	1.9800	7 1 43.0	14.624	12	0 5 47.92	1.9028	4 44 7.8
13	22 35 16.06	1.9766	6 47 4.9	14.644	13	0 7 42.09	1.9029	4 58 30.1
14	22 37 14.55	1.9733	6 32 25.7	14.663	14	0 9 36.27	1.9031	5 12 50.6
15	22 39 12.85	1.9701	6 17 45.3	14.682	15	0 11 30.46	1.9033	5 27 9.2
16	22 41 10.96	1.9669	6 3 3.8	14.699	16	0 13 24.67	1.9037	5 41 25.8
17	22 43 8.88	1.9638	5 48 21.4	14.714	17	0 15 18.90	1.9040	5 55 40.5
18	22 45 6.62	1.9609	5 33 38.1	14.729	18	0 17 13.15	1.9044	6 9 53.1
19	22 47 4.19	1.9580	5 18 53.9	14.743	19	0 19 7.43	1.9050	6 24 3.7
20	22 49 1.58	1.9551	5 4 9.0	14.754	20	0 21 1.75	1.9056	6 38 12.1
21	22 50 58.80	1.9523	4 49 23.4	14.766	21	0 22 56.10	1.9062	6 52 18.3
22	22 52 55.86	1.9497	4 34 37.1	14.777	22	0 24 50.49	1.9069	7 6 22.2
23	22 54 52.77	1.9472	4 19 50.2	14.786	23	0 26 44.93	1.9077	7 20 23.8
24	22 56 49.52	1.9446	S. 4 5 2.8	14.793	24	0 28 39.41	1.9084	N. 7 34 23.0

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
THURSDAY 21.					SATURDAY 23.				
0	h m s	s	" "	" "	0	h m s	s	" "	" "
0	28 39.41	1.9084	N. 7 34 23.0	13.967	0	2 2 11.23	2.0053	N. 17 41 17.7	10.980
1	30 33.94	1.9093	7 48 19.8	13.926	1	2 4 11.63	2.0082	17 52 14.0	10.896
2	32 28.53	1.9103	8 2 14.1	13.883	2	2 6 12.21	2.0111	18 3 5.2	10.812
3	34 23.18	1.9113	8 16 5.8	13.841	3	2 8 12.96	2.0140	18 13 51.4	10.727
4	36 17.88	1.9123	8 29 55.0	13.798	4	2 10 13.89	2.0170	18 24 32.4	10.641
5	38 12.65	1.9134	8 43 41.5	13.753	5	2 12 15.00	2.0199	18 35 8.3	10.554
6	40 7.49	1.9146	8 57 25.3	13.707	6	2 14 16.28	2.0229	18 45 38.9	10.466
7	42 2.40	1.9158	9 11 6.3	13.660	7	2 16 17.75	2.0260	18 56 4.2	10.377
8	43 57.38	1.9170	9 24 44.5	13.613	8	2 18 19.40	2.0290	19 6 24.2	10.288
9	45 52.44	1.9183	9 38 19.8	13.564	9	2 20 21.23	2.0321	19 16 38.8	10.198
10	47 47.58	1.9197	9 51 52.2	13.515	10	2 22 23.25	2.0352	19 26 47.9	10.107
11	49 42.81	1.9212	10 5 21.6	13.465	11	2 24 25.45	2.0382	19 36 51.6	10.015
12	51 38.13	1.9227	10 18 48.0	13.414	12	2 26 27.83	2.0413	19 46 49.7	9.922
13	53 33.54	1.9242	10 32 11.3	13.362	13	2 28 30.40	2.0443	19 56 42.3	9.829
14	55 29.04	1.9257	10 45 31.4	13.308	14	2 30 33.15	2.0474	20 6 29.2	9.735
15	57 24.63	1.9273	10 58 48.3	13.255	15	2 32 36.09	2.0505	20 16 10.5	9.640
16	59 20.32	1.9291	11 12 2.0	13.200	16	2 34 39.21	2.0536	20 25 46.0	9.544
17	1 16.12	1.9308	11 25 12.3	13.144	17	2 36 42.52	2.0568	20 35 15.8	9.447
18	3 12.02	1.9327	11 38 19.3	13.088	18	2 38 46.02	2.0598	20 44 39.7	9.350
19	5 8.04	1.9345	11 51 22.9	13.031	19	2 40 49.70	2.0629	20 53 57.8	9.252
20	7 4.16	1.9363	12 4 23.0	12.972	20	2 42 53.57	2.0661	21 3 10.0	9.154
21	9 0.40	1.9383	12 17 19.5	12.913	21	2 44 57.63	2.0692	21 12 16.3	9.055
22	10 56.76	1.9403	12 30 12.5	12.853	22	2 47 1.87	2.0723	21 21 16.6	8.954
23	12 53.24	1.9423	N. 12 43 1.8	12.791	23	2 49 6.30	2.0754	N. 21 30 10.8	8.853
FRIDAY 22.					SUNDAY 24.				
0	1 14 49.84	1.9444	N. 12 55 47.4	12.729	0	2 51 10.92	2.0785	N. 21 38 59.0	8.752
1	1 16 46.57	1.9465	13 8 29.3	12.667	1	2 53 15.72	2.0816	21 47 41.0	8.649
2	1 18 43.42	1.9486	13 21 7.4	12.603	2	2 55 20.71	2.0847	21 56 16.9	8.547
3	1 20 40.40	1.9508	13 33 41.6	12.538	3	2 57 25.88	2.0878	22 4 46.6	8.443
4	1 22 37.52	1.9532	13 46 11.9	12.473	4	2 59 31.24	2.0908	22 13 10.0	8.338
5	1 24 34.78	1.9554	13 58 38.3	12.406	5	3 1 36.78	2.0939	22 21 27.2	8.233
6	1 26 32.17	1.9577	14 11 0.6	12.338	6	3 3 42.51	2.0969	22 29 38.0	8.127
7	1 28 29.70	1.9600	14 23 18.9	12.270	7	3 5 48.41	2.0999	22 37 42.4	8.020
8	1 30 27.37	1.9624	14 35 33.0	12.201	8	3 7 54.50	2.1030	22 45 40.4	7.912
9	1 32 25.19	1.9649	14 47 43.0	12.132	9	3 10 0.77	2.1060	22 53 31.9	7.804
10	1 34 23.16	1.9674	14 59 48.8	12.061	10	3 12 7.22	2.1090	23 1 16.9	7.696
11	1 36 21.28	1.9698	15 11 50.3	11.989	11	3 14 13.85	2.1119	23 8 55.4	7.587
12	1 38 19.54	1.9723	15 23 47.5	11.917	12	3 16 20.65	2.1148	23 16 27.3	7.477
13	1 40 17.96	1.9750	15 35 40.3	11.843	13	3 18 27.63	2.1178	23 23 52.6	7.366
14	1 42 16.54	1.9776	15 47 28.7	11.769	14	3 20 34.78	2.1207	23 31 11.2	7.254
15	1 44 15.27	1.9802	15 59 12.6	11.694	15	3 22 42.11	2.1236	23 38 23.1	7.142
16	1 46 14.16	1.9828	16 10 52.0	11.618	16	3 24 49.61	2.1264	23 45 28.3	7.030
17	1 48 13.21	1.9855	16 22 26.8	11.541	17	3 26 57.28	2.1292	23 52 26.7	6.917
18	1 50 12.42	1.9883	16 33 56.9	11.463	18	3 29 5.12	2.1320	23 59 18.3	6.803
19	1 52 11.80	1.9911	16 45 22.4	11.385	19	3 31 13.12	2.1348	24 6 3.1	6.689
20	1 54 11.35	1.9939	16 56 43.1	11.306	20	3 33 21.29	2.1375	24 12 41.0	6.574
21	1 56 11.07	1.9967	17 7 59.1	11.226	21	3 35 29.62	2.1402	24 19 12.0	6.458
22	1 58 10.95	1.9994	17 19 10.2	11.144	22	3 37 38.11	2.1428	24 25 36.0	6.342
23	2 0 11.00	2.0023	17 30 16.4	11.062	23	3 39 46.76	2.1455	24 31 53.1	6.226
24	2 2 11.23	2.0053	N. 17 41 17.7	10.980	24	3 41 55.57	2.1482	N. 24 38 3.1	6.108

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.			Diff. for 1 Min.	Declination.			Diff. for 1 Min.	Hour.	Right Ascension.			Diff. for 1 Min.	Declination.			
MONDAY 25.									WEDNESDAY 27.								
	h	m	s	s	°	'	"	"		h	m	s	s	°	'	"	
0	3	41	55.57	2.1482	N. 24	38	3.1	6.108	0	5	27	6.72	2.2124	N. 27	8	22.4	
1	3	44	4.54	2.1507	24	44	6.1	5.991	1	5	29	19.46	2.2122	27	8	21.5	
2	3	46	13.65	2.1532	24	50	2.0	5.873	2	5	31	32.19	2.2120	27	8	12.8	
3	3	48	22.92	2.1557	24	55	50.8	5.754	3	5	33	44.90	2.2117	27	7	56.3	
4	3	50	32.33	2.1581	25	1	32.5	5.635	4	5	35	57.59	2.2113	27	7	32.0	
5	3	52	41.89	2.1606	25	7	7.0	5.515	5	5	38	10.25	2.2108	27	6	59.9	
6	3	54	51.60	2.1630	25	12	34.3	5.395	6	5	40	22.89	2.2103	27	6	19.9	
7	3	57	1.44	2.1652	25	17	54.4	5.274	7	5	42	35.49	2.2098	27	5	32.2	
8	3	59	11.42	2.1675	25	23	7.2	5.153	8	5	44	48.06	2.2092	27	4	36.7	
9	4	1	21.54	2.1697	25	28	12.7	5.031	9	5	47	0.59	2.2085	27	3	33.4	
10	4	3	31.79	2.1719	25	33	10.9	4.908	10	5	49	13.08	2.2077	27	2	22.3	
11	4	5	42.17	2.1740	25	38	1.7	4.786	11	5	51	25.52	2.2069	27	1	3.4	
12	4	7	52.67	2.1761	25	42	45.2	4.663	12	5	53	37.91	2.2060	26	59	36.8	
13	4	10	3.30	2.1782	25	47	21.3	4.540	13	5	55	50.24	2.2051	26	58	2.4	
14	4	12	14.05	2.1802	25	51	50.0	4.416	14	5	58	2.52	2.2041	26	56	20.3	
15	4	14	24.92	2.1821	25	56	11.2	4.291	15	6	0	14.73	2.2039	26	54	30.5	
16	4	16	35.90	2.1840	26	0	24.9	4.167	16	6	2	26.87	2.2018	26	52	32.9	
17	4	18	47.00	2.1858	26	4	31.2	4.042	17	6	4	38.95	2.2007	26	50	27.7	
18	4	20	58.20	2.1875	26	8	30.0	3.917	18	6	6	50.95	2.1994	26	48	14.8	
19	4	23	9.50	2.1892	26	12	21.2	3.791	19	6	9	2.88	2.1982	26	45	54.2	
20	4	25	20.91	2.1909	26	16	4.9	3.665	20	6	11	14.73	2.1968	26	43	25.9	
21	4	27	32.41	2.1925	26	19	41.0	3.538	21	6	13	26.49	2.1953	26	40	50.0	
22	4	29	44.01	2.1941	26	23	9.5	3.412	22	6	15	38.17	2.1939	26	38	6.5	
23	4	31	55.70	2.1956	N. 26	26	30.4	3.285	23	6	17	49.76	2.1924	N. 26	35	15.4	
TUESDAY 26.									THURSDAY 28.								
0	4	34	7.48	2.1970	N. 26	29	43.7	3.158	0	6	20	1.26	2.1909	N. 26	32	16.6	
1	4	36	19.34	2.1983	26	32	49.3	3.030	1	6	22	12.67	2.1893	26	29	10.3	
2	4	38	31.28	2.1997	26	35	47.3	2.903	2	6	24	23.97	2.1876	26	25	56.4	
3	4	40	43.30	2.2010	26	38	37.7	2.775	3	6	26	35.18	2.1859	26	22	35.0	
4	4	42	55.40	2.2022	26	41	20.3	2.646	4	6	28	46.28	2.1841	26	19	6.1	
5	4	45	7.56	2.2033	26	43	55.2	2.518	5	6	30	57.27	2.1823	26	15	29.6	
6	4	47	19.79	2.2043	26	46	22.4	2.389	6	6	33	8.15	2.1804	26	11	45.7	
7	4	49	32.08	2.2053	26	48	41.9	2.260	7	6	35	18.92	2.1785	26	7	54.3	
8	4	51	44.43	2.2062	26	50	53.6	2.131	8	6	37	29.57	2.1766	26	3	55.5	
9	4	53	56.83	2.2071	26	52	57.6	2.002	9	6	39	40.11	2.1746	25	59	49.3	
10	4	56	9.28	2.2079	26	54	53.8	1.873	10	6	41	50.52	2.1725	25	55	35.6	
11	4	58	21.78	2.2087	26	56	42.3	1.743	11	6	44	0.81	2.1705	25	51	14.6	
12	5	0	34.32	2.2093	26	58	23.0	1.613	12	6	46	10.98	2.1684	25	46	46.3	
13	5	2	46.90	2.2099	26	59	55.9	1.483	13	6	48	21.02	2.1663	25	42	10.6	
14	5	4	59.51	2.2105	27	1	21.0	1.353	14	6	50	30.93	2.1641	25	37	27.7	
15	5	7	12.16	2.2110	27	2	38.3	1.223	15	6	52	40.71	2.1618	25	32	37.5	
16	5	9	24.83	2.2114	27	3	47.8	1.093	16	6	54	50.35	2.1595	25	27	40.0	
17	5	11	37.53	2.2118	27	4	49.5	0.963	17	6	56	59.85	2.1573	25	22	35.3	
18	5	13	50.25	2.2121	27	5	43.3	0.833	18	6	59	9.22	2.1550	25	17	23.4	
19	5	16	2.98	2.2123	27	6	29.4	0.703	19	7	1	18.45	2.1526	25	12	4.4	
20	5	18	15.72	2.2124	27	7	7.7	0.573	20	7	3	27.53	2.1502	25	6	38.2	
21	5	20	28.47	2.2125	27	7	38.1	0.442	21	7	5	36.47	2.1478	25	1	4.9	
22	5	22	41.22	2.2125	27	8	0.7	0.312	22	7	7	45.27	2.1454	24	55	24.5	
23	5	24	53.97	2.2125	27	8	15.5	0.181	23	7	9	53.92	2.1430	24	49	37.1	
24	5	27	6.72	2.2124	N. 27	8	22.4	0.050	24	7	12	2.42	2.1404	N. 24	43	42.6	

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
FRIDAY 29.					SUNDAY 31.				
	^h ^m ^s	^s	[°] ['] ["]	["]		^h ^m ^s	^s	[°] ['] ["]	["]
0	7 12 2.42	2.1404	N. 24 43 42.6	5.967	0	8 51 45.10	2.0172	N. 17 53 0.2	10.921
1	7 14 10.77	2.1379	24 37 41.1	6.083	1	8 53 46.07	2.0151	17 42 2.3	11.008
2	7 16 18.97	2.1353	24 31 32.7	6.198	2	8 55 46.91	2.0129	17 30 59.2	11.096
3	7 18 27.01	2.1328	24 25 17.3	6.314	3	8 57 47.62	2.0108	17 19 50.8	11.183
4	7 20 34.90	2.1303	24 18 55.0	6.428	4	8 59 48.21	2.0088	17 8 37.2	11.269
5	7 22 42.64	2.1277	24 12 25.9	6.543	5	9 1 48.68	2.0069	16 57 18.5	11.354
6	7 24 50.22	2.1250	24 5 49.9	6.657	6	9 3 49.04	2.0050	16 45 54.7	11.439
7	7 26 57.64	2.1223	23 59 7.1	6.770	7	9 5 49.28	2.0030	16 34 25.8	11.523
8	7 29 4.90	2.1197	23 52 17.5	6.883	8	9 7 49.40	2.0011	16 22 51.9	11.607
9	7 31 12.00	2.1171	23 45 21.1	6.996	9	9 9 49.41	1.9993	16 11 13.0	11.690
10	7 33 18.95	2.1144	23 38 18.0	7.107	10	9 11 49.32	1.9976	15 59 29.1	11.772
11	7 35 25.73	2.1117	23 31 8.2	7.218	11	9 13 49.12	1.9958	15 47 40.3	11.854
12	7 37 32.35	2.1090	23 23 51.8	7.328	12	9 15 48.82	1.9942	15 35 46.6	11.935
13	7 39 38.81	2.1063	23 16 28.8	7.439	13	9 17 48.42	1.9925	15 23 48.1	12.015
14	7 41 45.11	2.1036	23 8 59.1	7.549	14	9 19 47.92	1.9909	15 11 44.8	12.094
15	7 43 51.24	2.1008	23 1 22.9	7.658	15	9 21 47.33	1.9893	14 59 36.8	12.173
16	7 45 57.21	2.0982	22 53 40.2	7.767	16	9 23 46.64	1.9878	14 47 24.1	12.251
17	7 48 3.02	2.0955	22 45 50.9	7.875	17	9 25 45.87	1.9864	14 35 6.7	12.328
18	7 50 8.67	2.0928	22 37 55.2	7.982	18	9 27 45.01	1.9850	14 22 44.7	12.405
19	7 52 14.15	2.0900	22 29 53.1	8.088	19	9 29 44.07	1.9837	14 10 18.1	12.482
20	7 54 19.47	2.0873	22 21 44.6	8.194	20	9 31 43.05	1.9824	13 57 46.9	12.557
21	7 56 24.63	2.0847	22 13 29.8	8.300	21	9 33 41.96	1.9812	13 45 11.3	12.631
22	7 58 29.63	2.0820	22 5 8.6	8.405	22	9 35 40.79	1.9799	13 32 31.2	12.705
23	8 0 34.47	2.0793	N. 21 56 41.2	8.509	23	9 37 39.55	1.9788	N. 13 19 46.7	12.778
SATURDAY 30.					MONDAY, NOVEMBER 1.				
	^h ^m ^s	^s	[°] ['] ["]	["]		^h ^m ^s	^s	[°] ['] ["]	["]
0	8 2 39.15	2.0767	N. 21 48 7.5	8.613	0	9 39 38.25	1.9778	N. 13 6 57.8	12.851
1	8 4 43.67	2.0739	21 39 27.6	8.716					
2	8 6 48.02	2.0712	21 30 41.6	8.818					
3	8 8 52.21	2.0685	21 21 49.4	8.921					
4	8 10 56.24	2.0659	21 12 51.1	9.023					
5	8 13 0.12	2.0633	21 3 46.7	9.123					
6	8 15 3.84	2.0607	20 54 36.3	9.223					
7	8 17 7.40	2.0580	20 45 19.9	9.323					
8	8 19 10.80	2.0554	20 35 57.6	9.422					
9	8 21 14.05	2.0529	20 26 29.3	9.521					
10	8 23 17.15	2.0503	20 16 55.1	9.618					
11	8 25 20.09	2.0478	20 7 15.1	9.715					
12	8 27 22.88	2.0453	19 57 29.3	9.812					
13	8 29 25.52	2.0428	19 47 37.7	9.908					
14	8 31 28.01	2.0403	19 37 40.4	10.003					
15	8 33 30.35	2.0378	19 27 37.4	10.097					
16	8 35 32.55	2.0353	19 17 28.8	10.191					
17	8 37 34.61	2.0328	19 7 14.5	10.285					
18	8 39 36.52	2.0303	18 56 54.6	10.378					
19	8 41 38.29	2.0278	18 46 29.2	10.470					
20	8 43 39.92	2.0261	18 35 58.2	10.562					
21	8 45 41.42	2.0238	18 25 21.8	10.652					
22	8 47 42.78	2.0216	18 14 40.0	10.742					
23	8 49 44.01	2.0193	18 3 52.8	10.832					
24	8 51 45.10	2.0172	N. 17 53 0.2	10.921					

PHASES OF THE MOON.

● New Moon Oct. 8 9 42.1
 ☾ First Quarter 15 1 51.5
 ○ Full Moon 22 12 15.5
 ☾ Last Quarter 30 16 39.8

☾ Perigee Oct. 11 0.1
 ☾ Apogee 26 23.1

AT GREENWICH APPARENT NOON.

Day of the Week.	Day of the Month.	THE SUN'S						Sidereal Time of Semidiameter Passing Meridian.	Equation of Time, to be Subtracted from Apparent Time.	Diff. for Hour.
		Apparent Right Ascension.	Diff. for 1 Hour.	Apparent Declination.	Diff. for 1 Hour.	Semidiameter.				
		h m s	s	° ' "	"	' "	s	m s	s	
Mon.	1	14 22 24.37	9.768	S.14 10 24.3	-48.58	16 8.92	66.80	16 19.11	0.088	
Tues.	2	14 26 19.20	9.802	14 29 43.5	48.01	16 9.17	66.92	16 20.84	0.054	
Wed.	3	14 30 14.84	9.836	14 48 48.8	47.42	16 9.41	67.03	16 21.74	0.020	
Thur.	4	14 34 11.32	9.870	15 7 39.7	-46.81	16 9.65	67.15	16 21.83	0.015	
Fri.	5	14 38 8.62	9.905	15 26 15.7	46.18	16 9.89	67.26	16 21.08	0.049	
Sat.	6	14 42 6.77	9.940	15 44 36.6	45.54	16 10.13	67.38	16 19.49	0.084	
SUN.	7	14 46 5.75	9.975	16 2 41.8	-44.88	16 10.37	67.50	16 17.07	0.119	
Mon.	8	14 50 5.57	10.010	16 20 30.9	44.20	16 10.61	67.62	16 13.81	0.154	
Tues.	9	14 54 6.24	10.045	16 38 3.4	43.50	16 10.84	67.74	16 9.72	0.188	
Wed.	10	14 58 7.73	10.080	16 55 19.0	-42.79	16 11.08	67.86	16 4.79	0.223	
Thur.	11	15 2 10.06	10.114	17 12 17.2	42.06	16 11.31	67.98	15 59.04	0.258	
Fri.	12	15 6 13.22	10.149	17 28 57.7	41.31	16 11.54	68.10	15 52.44	0.292	
Sat.	13	15 10 17.22	10.184	17 45 20.0	-40.54	16 11.77	68.22	15 45.03	0.327	
SUN.	14	15 14 22.05	10.218	18 1 23.7	39.76	16 12.00	68.34	15 36.78	0.361	
Mon.	15	15 18 27.71	10.253	18 17 8.5	38.96	16 12.22	68.46	15 27.70	0.396	
Tues.	16	15 22 34.20	10.288	18 32 34.0	-38.15	16 12.44	68.58	15 17.80	0.430	
Wed.	17	15 26 41.51	10.322	18 47 39.8	37.32	16 12.66	68.70	15 7.07	0.465	
Thur.	18	15 30 49.66	10.356	19 2 25.5	36.47	16 12.87	68.82	14 55.51	0.499	
Fri.	19	15 34 58.62	10.391	19 16 50.9	-35.61	16 13.08	68.94	14 43.14	0.533	
Sat.	20	15 39 8.41	10.425	19 30 55.4	34.74	16 13.28	69.05	14 29.94	0.567	
SUN.	21	15 43 19.02	10.459	19 44 38.8	33.86	16 13.48	69.16	14 15.93	0.601	
Mon.	22	15 47 30.43	10.493	19 58 0.7	-32.96	16 13.67	69.27	14 1.11	0.634	
Tues.	23	15 51 42.66	10.526	20 11 0.8	32.04	16 13.86	69.38	13 45.49	0.668	
Wed.	24	15 55 55.68	10.559	20 23 38.7	31.11	16 14.04	69.48	13 29.07	0.701	
Thur.	25	16 0 9.49	10.592	20 35 54.0	-30.16	16 14.22	69.59	13 11.87	0.733	
Fri.	26	16 4 24.08	10.624	20 47 46.4	29.20	16 14.40	69.69	12 53.88	0.765	
Sat.	27	16 8 39.43	10.656	20 59 15.6	28.23	16 14.57	69.80	12 35.14	0.797	
SUN.	28	16 12 55.54	10.687	21 10 21.2	-27.24	16 14.74	69.90	12 15.64	0.828	
Mon.	29	16 17 12.39	10.717	21 21 3.0	26.23	16 14.90	70.00	11 55.40	0.858	
Tues.	30	16 21 29.96	10.747	21 31 20.5	25.22	16 15.05	70.09	11 34.45	0.888	
Wed.	31	16 25 48.24	10.776	S.21 41 13.5	-24.19	16 15.20	70.18	11 12.79	0.917	

NOTE.—The mean time of semidiameter passing the meridian may be found by subtracting 0.18 from the sidereal time.

The sign — prefixed to the hourly change of declination indicates that south declinations are increasing.

AT GREENWICH MEAN NOON.

Day of the Week.	Day of the Month.	THE SUN'S				Equation of Time, to be Added to Mean Time.	Diff. for 1 Hour.	Sidereal Time, or Right Ascension of Mean Sun.
		Apparent Right Ascension.	Diff. for 1 Hour.	Apparent Declination.	Diff. for 1 Hour.			
		h m s	s	° ' "	"	m s	s	h m s
Mon.	1	14 22 27.02	9.768	S. 14 10 37.5	-48.57	16 19.14	0.088	14 38 46.16
Tues.	2	14 26 21.87	9.802	14 29 56.6	48.00	16 20.85	0.054	14 42 42.72
Wed.	3	14 30 17.52	9.836	14 49 1.7	47.41	16 21.75	0.020	14 46 39.27
Thur.	4	14 34 14.01	9.870	15 7 52.4	-46.80	16 21.82	0.015	14 50 35.83
Fri.	5	14 38 11.32	9.905	15 26 28.3	46.18	16 21.06	0.049	14 54 32.38
Sat.	6	14 42 9.47	9.940	15 44 49.0	45.54	16 19.47	0.084	14 58 28.94
SUN.	7	14 46 8.46	9.975	16 2 54.0	-44.87	16 17.04	0.119	15 2 25.50
Mon.	8	14 50 8.28	10.010	16 20 42.8	44.19	16 13.77	0.154	15 6 22.05
Tues.	9	14 54 8.94	10.045	16 38 15.2	43.49	16 9.67	0.188	15 10 18.61
Wed.	10	14 58 10.43	10.080	16 55 30.5	-42.78	16 4.73	0.223	15 14 15.16
Thur.	11	15 2 12.76	10.114	17 12 28.5	42.04	15 58.97	0.258	15 18 11.72
Fri.	12	15 6 15.91	10.149	17 29 8.6	41.29	15 52.37	0.292	15 22 8.28
Sat.	13	15 10 19.90	10.183	17 45 30.6	-40.53	15 44.94	0.327	15 26 4.84
SUN.	14	15 14 24.71	10.218	18 1 34.1	39.75	15 36.68	0.361	15 30 1.39
Mon.	15	15 18 30.35	10.252	18 17 18.5	38.95	15 27.60	0.396	15 33 57.95
Tues.	16	15 22 36.82	10.287	18 32 43.7	-38.14	15 17.69	0.430	15 37 54.51
Wed.	17	15 26 44.11	10.321	18 47 49.2	37.31	15 6.95	0.465	15 41 51.06
Thur.	18	15 30 52.23	10.356	19 2 34.6	36.47	14 55.39	0.499	15 45 47.62
Fri.	19	15 35 1.17	10.390	19 16 59.6	-35.61	14 43.01	0.533	15 49 44.18
Sat.	20	15 39 10.93	10.424	19 31 3.8	34.74	14 29.81	0.567	15 53 40.73
SUN.	21	15 43 21.50	10.457	19 44 46.9	33.85	14 15.79	0.601	15 57 37.29
Mon.	22	15 47 32.88	10.491	19 58 8.4	-32.95	14 0.96	0.634	16 1 33.85
Tues.	23	15 51 45.07	10.524	20 11 8.1	32.03	13 45.34	0.668	16 5 30.41
Wed.	24	15 55 58.05	10.557	20 23 45.7	31.10	13 28.91	0.701	16 9 26.96
Thur.	25	16 0 11.82	10.590	20 36 0.6	-30.15	13 11.70	0.733	16 13 23.52
Fri.	26	16 4 26.36	10.622	20 47 52.7	29.19	12 53.72	0.765	16 17 20.08
Sat.	27	16 8 41.67	10.653	20 59 21.5	28.21	12 34.97	0.797	16 21 16.64
SUN.	28	16 12 57.72	10.684	21 10 26.8	-27.22	12 15.47	0.828	16 25 13.20
Mon.	29	16 17 14.52	10.715	21 21 8.2	26.22	11 55.23	0.858	16 29 9.75
Tues.	30	16 21 32.04	10.745	21 31 25.3	25.21	11 34.28	0.888	16 33 6.31
Wed.	31	16 25 50.25	10.773	S. 21 41 18.0	-24.18	11 12.62	0.917	16 37 2.87

NOTE.—The semidiameter for mean noon may be assumed the same as that for apparent noon.
The sign — prefixed to the hourly change of declination indicates that south declinations are increasing.

Diff. for 1 Hour,
+9°.8565.
(Table III.)

AT GREENWICH MEAN NOON.

Day of the Month.	Day of the Year.	THE SUN'S				Logarithm of the Radius Vector of the Earth.	Diff. for 1 Hour.	Mean Time of Sidereal Noon.
		True Longitude.		Diff. for 1 Hour.	Latitude.			
		λ	λ'					
		$^{\circ}$ $'$ $''$	$^{\circ}$ $'$ $''$	$''$	$''$			h m s
1	305	217 59 13.1	58 20.2	150.14	-0.20	9.996 6623	-45.9	9 19 41.89
2	306	218 59 17.4	58 24.4	150.23	0.32	9.996 5525	45.6	9 15 45.98
3	307	219 59 23.9	58 30.7	150.31	0.42	9.996 4435	45.3	9 11 50.07
4	308	220 59 32.4	58 39.1	150.40	-0.50	9.996 3350	-45.1	9 7 54.16
5	309	221 59 43.0	58 49.5	150.48	0.56	9.996 2272	44.9	9 3 58.25
6	310	222 59 55.5	59 1.9	150.56	0.60	9.996 1197	44.6	9 0 2.34
7	311	223 60 9.8	59 16.1	150.63	-0.62	9.996 0128	-44.4	8 56 6.43
8	312	224 60 26.0	59 32.0	150.70	0.60	9.995 9063	44.2	8 52 10.52
9	313	225 60 43.8	59 49.7	150.77	0.54	9.995 8004	44.0	8 48 14.61
10	314	227 1 3.1	0 8.9	150.84	-0.45	9.995 6951	-43.7	8 44 18.70
11	315	228 1 23.9	0 29.6	150.90	0.35	9.995 5906	43.4	8 40 22.79
12	316	229 1 46.2	0 51.7	150.96	0.22	9.995 4870	43.0	8 36 26.88
13	317	230 2 9.8	1 15.2	151.02	-0.08	9.995 3845	-42.5	8 32 30.97
14	318	231 2 34.8	1 40.0	151.08	+0.05	9.995 2833	41.9	8 28 35.06
15	319	232 3 1.1	2 6.1	151.14	0.17	9.995 1835	41.2	8 24 39.15
16	320	233 3 28.8	2 33.6	151.19	+0.28	9.995 0854	-40.5	8 20 43.24
17	321	234 3 57.7	3 2.4	151.24	0.37	9.994 9890	39.8	8 16 47.33
18	322	235 4 28.0	3 32.6	151.30	0.44	9.994 8945	39.0	8 12 51.42
19	323	236 4 59.7	4 4.1	151.35	+0.48	9.994 8020	-38.2	8 8 55.50
20	324	237 5 32.8	4 37.0	151.41	0.49	9.994 7116	37.3	8 4 59.59
21	325	238 6 7.3	5 11.4	151.47	0.47	9.994 6232	36.4	8 1 3.68
22	326	239 6 43.3	5 47.2	151.53	+0.43	9.994 5370	-35.5	7 57 7.77
23	327	240 7 20.8	6 24.4	151.59	0.37	9.994 4529	34.6	7 53 11.86
24	328	241 7 59.7	7 3.1	151.65	0.28	9.994 3710	33.7	7 49 15.95
25	329	242 8 40.1	7 43.4	151.72	+0.17	9.994 2913	-32.8	7 45 20.04
26	330	243 9 22.1	8 25.2	151.78	+0.05	9.994 2137	31.9	7 41 24.12
27	331	244 10 5.6	9 8.5	151.84	-0.07	9.994 1381	31.1	7 37 28.21
28	332	245 10 50.6	9 53.4	151.90	-0.19	9.994 0646	-30.2	7 33 32.30
29	333	246 11 37.2	10 39.8	151.97	0.31	9.993 9930	29.4	7 29 36.39
30	334	247 12 25.2	11 27.6	152.03	0.41	9.993 9233	28.7	7 25 40.48
31	335	248 13 14.8	12 17.0	152.09	-0.50	9.993 8554	-28.0	7 21 44.56

NOTE.—The longitudes in the column λ are referred to the true equinox of their own date, while those in the column λ' are referred to the mean equinox of the beginning of the Besselian fictitious year.

Diff. for 1 Hour,
—9^h.8296.
(Table 11.)

GREENWICH MEAN TIME.

Day of the Month.	THE MOON'S									
	SEMIDIAMETER.		HORIZONTAL PARALLAX.				UPPER TRANSIT.		AGE.	
	Noon.	Midnight.	Noon.	Diff. for 1 Hour.	Midnight.	Diff. for 1 Hour.	Meridian of Greenwich.	Diff. for 1 Hour.	Noon.	
	' "	' "	' "	"	' "	"	h m	m	d	
1	15 18.2	15 24.8	56 3.82	+1.969	56 28.35	+2.115	19 36.3	1.86	23.6	
2	15 32.0	15 39.4	56 54.47	2.232	57 21.78	2.313	20 21.2	1.89	24.6	
3	15 47.0	15 54.7	57 49.82	2.353	58 18.06	2.345	21 7.4	1.97	25.6	
4	16 2.3	16 9.6	58 45.90	+2.286	59 12.70	+2.171	21 56.3	2.11	26.6	
5	16 16.5	16 22.6	59 37.78	1.999	60 0.46	1.772	22 49.0	2.30	27.6	
6	16 28.0	16 32.4	60 20.10	1.494	60 36.14	1.174	23 46.7	2.51	28.6	
7	16 35.6	16 37.7	60 48.15	+0.823	60 55.80	+0.449	6	.	0.2	
8	16 38.6	16 38.2	60 58.91	+0.070	60 57.51	-0.301	0 49.1	2.68	1.2	
9	16 36.6	16 34.0	60 51.77	-0.651	60 42.00	0.970	1 54.6	2.75	2.2	
10	16 30.3	16 25.8	60 28.64	-1.249	60 12.21	-1.481	3 0.2	2.68	3.2	
11	16 20.7	16 15.0	59 53.29	1.664	59 32.46	1.799	4 2.7	2.51	4.2	
12	16 9.0	16 2.7	59 10.31	1.886	58 47.36	1.932	5 0.2	2.28	5.2	
13	15 56.4	15 50.1	58 24.10	-1.939	58 0.96	-1.913	5 52.4	2.07	6.2	
14	15 43.9	15 37.9	57 38.28	1.864	57 16.31	1.795	6 40.3	1.92	7.2	
15	15 32.2	15 26.7	56 55.26	1.711	56 35.30	1.616	7 25.1	1.82	8.2	
16	15 21.6	15 16.8	56 16.51	-1.515	55 58.95	-1.411	8 8.1	1.78	9.2	
17	15 12.4	15 8.3	55 42.65	1.306	55 27.59	1.204	8 50.7	1.78	10.2	
18	15 4.5	15 1.1	55 13.75	1.103	55 1.11	1.004	9 33.9	1.82	11.2	
19	14 57.9	14 55.1	54 49.63	-0.910	54 39.26	-0.818	10 18.4	1.89	12.2	
20	14 52.6	14 50.4	54 29.99	0.726	54 21.83	0.633	11 5.0	1.98	13.2	
21	14 48.4	14 46.8	54 14.80	0.538	54 8.92	0.441	11 53.6	2.06	14.2	
22	14 45.6	14 44.6	54 4.22	-0.341	54 0.76	-0.234	12 43.8	2.11	15.2	
23	14 44.0	14 43.9	53 58.64	-0.119	53 57.94	+0.003	13 34.6	2.12	16.2	
24	14 44.1	14 44.8	53 58.75	+0.134	54 1.20	0.276	14 25.0	2.08	17.2	
25	14 45.9	14 47.6	54 5.41	+0.427	54 11.49	+0.588	15 14.0	2.00	18.2	
26	14 49.8	14 52.5	54 19.55	0.757	54 29.69	0.934	16 1.0	1.92	19.2	
27	14 55.9	14 59.8	54 41.99	1.117	54 56.51	1.304	16 46.2	1.85	20.2	
28	15 4.4	15 9.6	55 13.29	+1.492	55 32.31	+1.677	17 30.0	1.81	21.2	
29	15 15.4	15 21.7	55 53.50	1.854	56 16.76	2.020	18 13.4	1.81	22.2	
30	15 28.5	15 35.8	56 41.91	2.168	57 8.69	2.291	18 57.3	1.86	23.2	
31	15 43.5	15 51.4	57 36.77	+2.383	58 5.73	+2.437	19 43.2	1.98	24.2	

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
MONDAY 1.					WEDNESDAY 3.				
0	h m s	s	"	"	0	h m s	s	"	"
0	9 39 38.25	1.9778	N. 13 6 57.8	12.851	0	11 14 33.02	2.0043	N. 1 41 44.7	15.363
1	9 41 36.89	1.9768	12 54 4.6	12.923	1	11 16 33.35	2.0067	1 26 22.0	15.392
2	9 43 35.47	1.9758	12 41 7.1	12.993	2	11 18 33.82	2.0091	1 10 57.7	15.419
3	9 45 33.99	1.9749	12 28 5.4	13.063	3	11 20 34.44	2.0117	0 55 31.7	15.446
4	9 47 32.46	1.9741	12 14 59.5	13.133	4	11 22 35.22	2.0143	0 40 4.2	15.471
5	9 49 30.88	1.9733	12 1 49.5	13.201	5	11 24 36.16	2.0170	0 24 35.2	15.496
6	9 51 29.25	1.9725	11 48 35.4	13.269	6	11 26 37.26	2.0198	N. 0 9 4.7	15.520
7	9 53 27.58	1.9719	11 35 17.2	13.337	7	11 28 38.54	2.0228	S. 0 6 27.2	15.542
8	9 55 25.88	1.9713	11 21 55.0	13.403	8	11 30 39.99	2.0258	0 22 0.3	15.562
9	9 57 24.14	1.9708	11 8 28.8	13.469	9	11 32 41.63	2.0288	0 37 34.6	15.582
10	9 59 22.37	1.9703	10 54 58.7	13.534	10	11 34 43.45	2.0319	0 53 10.1	15.601
11	10 1 20.57	1.9698	10 41 24.7	13.598	11	11 36 45.46	2.0352	1 8 46.7	15.618
12	10 3 18.75	1.9695	10 27 46.9	13.662	12	11 38 47.67	2.0385	1 24 24.2	15.633
13	10 5 16.91	1.9693	10 14 5.3	13.724	13	11 40 50.08	2.0419	1 40 2.6	15.648
14	10 7 15.06	1.9690	10 0 20.0	13.786	14	11 42 52.70	2.0454	1 55 41.9	15.662
15	10 9 13.19	1.9688	9 46 31.0	13.847	15	11 44 55.53	2.0489	2 11 22.0	15.674
16	10 11 11.32	1.9688	9 32 38.4	13.907	16	11 46 58.57	2.0526	2 27 2.8	15.684
17	10 13 9.45	1.9688	9 18 42.2	13.967	17	11 49 1.84	2.0563	2 42 44.1	15.693
18	10 15 7.57	1.9688	9 4 42.4	14.025	18	11 51 5.33	2.0602	2 58 25.9	15.701
19	10 17 5.70	1.9689	8 50 39.2	14.083	19	11 53 9.06	2.0641	3 14 8.2	15.708
20	10 19 3.84	1.9691	8 36 32.5	14.140	20	11 55 13.02	2.0681	3 29 50.8	15.713
21	10 21 1.99	1.9693	8 22 22.4	14.196	21	11 57 17.23	2.0722	3 45 33.7	15.717
22	10 23 0.15	1.9696	8 8 9.0	14.251	22	11 59 21.68	2.0763	4 1 16.8	15.719
23	10 24 58.34	1.9701	N. 7 53 52.3	14.306	23	12 1 26.39	2.0807	S. 4 17 0.0	15.720
TUESDAY 2.					THURSDAY 4.				
0	h m s	s	"	"	0	h m s	s	"	"
0	10 26 56.56	1.9706	N. 7 39 32.3	14.359	0	12 3 31.36	2.0850	S. 4 32 43.2	15.719
1	10 28 54.81	1.9711	7 25 9.2	14.412	1	12 5 36.59	2.0894	4 48 26.3	15.718
2	10 30 53.09	1.9717	7 10 42.9	14.464	2	12 7 42.09	2.0939	5 4 9.3	15.714
3	10 32 51.41	1.9723	6 56 13.5	14.515	3	12 9 47.86	2.0985	5 19 52.0	15.709
4	10 34 49.77	1.9731	6 41 41.1	14.564	4	12 11 53.91	2.1033	5 35 34.4	15.703
5	10 36 48.18	1.9739	6 27 5.8	14.613	5	12 14 0.25	2.1080	5 51 16.3	15.694
6	10 38 46.64	1.9748	6 12 27.5	14.662	6	12 16 6.87	2.1128	6 6 57.7	15.684
7	10 40 45.15	1.9758	5 57 46.3	14.709	7	12 18 13.78	2.1178	6 22 38.4	15.673
8	10 42 43.73	1.9768	5 43 2.4	14.755	8	12 20 21.00	2.1228	6 38 18.5	15.662
9	10 44 42.37	1.9779	5 28 15.7	14.801	9	12 22 28.52	2.1279	6 53 57.8	15.647
10	10 46 41.08	1.9792	5 13 26.3	14.845	10	12 24 36.35	2.1331	7 9 36.1	15.631
11	10 48 39.87	1.9805	4 58 34.3	14.888	11	12 26 44.49	2.1384	7 25 13.5	15.613
12	10 50 38.74	1.9818	4 43 39.7	14.932	12	12 28 52.96	2.1438	7 40 49.7	15.593
13	10 52 37.69	1.9833	4 28 42.5	14.973	13	12 31 1.75	2.1492	7 56 24.7	15.573
14	10 54 36.73	1.9848	4 13 42.9	15.013	14	12 33 10.86	2.1547	8 11 58.4	15.550
15	10 56 35.86	1.9863	3 58 40.9	15.053	15	12 35 20.31	2.1603	8 27 30.7	15.526
16	10 58 35.09	1.9880	3 43 36.6	15.092	16	12 37 30.10	2.1660	8 43 1.5	15.500
17	11 0 34.42	1.9898	3 28 29.9	15.129	17	12 39 40.23	2.1718	8 58 30.7	15.473
18	11 2 33.86	1.9916	3 13 21.1	15.165	18	12 41 50.71	2.1776	9 13 58.2	15.443
19	11 4 33.41	1.9935	2 58 10.1	15.202	19	12 44 1.54	2.1835	9 29 23.9	15.412
20	11 6 33.08	1.9955	2 42 56.9	15.237	20	12 46 12.73	2.1895	9 44 47.6	15.378
21	11 8 32.87	1.9976	2 27 41.7	15.269	21	12 48 24.28	2.1956	10 0 9.3	15.343
22	11 10 32.79	1.9998	2 12 24.6	15.301	22	12 50 36.20	2.2018	10 15 28.8	15.307
23	11 12 32.84	2.0019	1 57 5.6	15.333	23	12 52 48.49	2.2080	10 30 46.1	15.268
24	11 14 33.02	2.0043	N. 1 41 44.7	15.363	24	12 55 1.16	2.2144	S. 10 46 1.0	15.228

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
FRIDAY 5.					SUNDAY 7.				
	h m s	s	° ' "	"		h m s	s	° ' "	"
0	12 55 1.16	2.2143	S. 10 46 1.0	15.228	0	14 49 37.45	2.5717	S. 21 31 40.0	10.848
1	12 57 14.21	2.2207	11 1 13.4	15.185	1	14 52 11.08	2.5793	21 42 26.6	10.704
2	12 59 27.64	2.2271	11 16 23.2	15.141	2	14 54 46.06	2.5868	21 53 4.5	10.558
3	13 1 41.46	2.2337	11 31 30.3	15.095	3	14 57 22.39	2.5941	22 3 33.5	10.409
4	13 3 55.68	2.2403	11 46 34.6	15.047	4	14 59 58.25	2.6014	22 13 53.6	10.258
5	13 6 10.29	2.2468	12 1 35.9	14.997	5	15 2 34.56	2.6088	22 24 4.5	10.105
6	13 8 25.30	2.2536	12 16 34.2	14.945	6	15 5 11.31	2.6160	22 34 6.2	9.951
7	13 10 40.72	2.2604	12 31 29.3	14.891	7	15 7 48.48	2.6231	22 43 58.6	9.794
8	13 12 56.55	2.2673	12 46 21.1	14.835	8	15 10 26.08	2.6302	22 53 41.5	9.635
9	13 15 12.80	2.2743	13 1 9.5	14.777	9	15 13 4.10	2.6371	23 3 14.8	9.474
10	13 17 29.46	2.2813	13 15 54.3	14.716	10	15 15 42.53	2.6439	23 12 38.4	9.312
11	13 19 46.55	2.2883	13 30 35.4	14.654	11	15 18 21.37	2.6508	23 21 52.2	9.147
12	13 22 4.06	2.2954	13 45 12.8	14.591	12	15 21 0.62	2.6575	23 30 56.0	8.980
13	13 24 22.00	2.3026	13 59 46.3	14.525	13	15 23 40.27	2.6641	23 39 49.8	8.812
14	13 26 40.37	2.3098	14 14 15.8	14.457	14	15 26 20.31	2.6706	23 48 33.4	8.641
15	13 28 59.18	2.3171	14 28 41.1	14.387	15	15 29 0.74	2.6769	23 57 6.7	8.468
16	13 31 18.42	2.3244	14 43 2.2	14.314	16	15 31 41.54	2.6832	24 5 29.6	8.295
17	13 33 38.11	2.3318	14 57 18.8	14.239	17	15 34 22.72	2.6893	24 13 42.1	8.120
18	13 35 58.24	2.3393	15 11 30.9	14.163	18	15 37 4.26	2.6953	24 21 44.0	7.942
19	13 38 18.82	2.3468	15 25 38.4	14.085	19	15 39 46.15	2.7012	24 29 35.1	7.763
20	13 40 39.85	2.3543	15 39 41.1	14.004	20	15 42 28.40	2.7069	24 37 15.5	7.583
21	13 43 1.33	2.3618	15 53 38.9	13.921	21	15 45 10.98	2.7125	24 44 45.0	7.400
22	13 45 23.27	2.3694	16 7 31.6	13.836	22	15 47 53.09	2.7180	24 52 3.5	7.216
23	13 47 45.66	2.3770	S. 16 21 19.2	13.748	23	15 50 37.14	2.7233	S. 24 59 10.9	7.031
SATURDAY 6.					MONDAY 8.				
	h m s	s	° ' "	"		h m s	s	° ' "	"
0	13 50 8.51	2.3847	S. 16 35 1.4	13.658	0	15 53 20.70	2.7286	S. 25 6 7.2	6.844
1	13 52 31.82	2.3924	16 48 38.2	13.567	1	15 56 4.57	2.7336	25 12 52.2	6.656
2	13 54 55.60	2.4002	17 2 9.4	13.473	2	15 58 48.73	2.7384	25 19 25.9	6.466
3	13 57 19.84	2.4079	17 15 35.0	13.378	3	16 1 33.18	2.7431	25 25 48.1	6.274
4	13 59 44.55	2.4158	17 28 54.7	13.279	4	16 4 17.90	2.7476	25 31 58.8	6.082
5	14 2 9.73	2.4235	17 42 8.5	13.178	5	16 7 2.89	2.7520	25 37 57.9	5.888
6	14 4 35.37	2.4313	17 55 16.1	13.075	6	16 9 48.14	2.7562	25 43 45.4	5.694
7	14 7 1.49	2.4393	18 8 17.5	12.971	7	16 12 33.63	2.7602	25 49 21.2	5.498
8	14 9 28.08	2.4470	18 21 12.6	12.864	8	16 15 19.36	2.7640	25 54 45.2	5.301
9	14 11 55.13	2.4548	18 34 1.2	12.754	9	16 18 5.31	2.7676	25 59 57.3	5.102
10	14 14 22.66	2.4628	18 46 43.1	12.643	10	16 20 51.47	2.7711	26 4 57.4	4.903
11	14 16 50.66	2.4707	18 59 18.3	12.529	11	16 23 37.84	2.7744	26 9 45.6	4.703
12	14 19 19.14	2.4786	19 11 46.6	12.413	12	16 26 24.40	2.7775	26 14 21.8	4.502
13	14 21 48.09	2.4864	19 24 7.9	12.295	13	16 29 11.14	2.7804	26 18 45.8	4.299
14	14 24 17.51	2.4943	19 36 22.0	12.174	14	16 31 58.05	2.7831	26 22 57.7	4.097
15	14 26 47.40	2.5021	19 48 28.8	12.052	15	16 34 45.11	2.7855	26 26 57.4	3.893
16	14 29 17.76	2.5100	20 0 28.2	11.927	16	16 37 32.31	2.7878	26 30 44.8	3.688
17	14 31 48.60	2.5178	20 12 20.0	11.800	17	16 40 19.65	2.7900	26 34 20.0	3.483
18	14 34 19.90	2.5256	20 24 4.2	11.671	18	16 43 7.11	2.7918	26 37 42.8	3.278
19	14 36 51.67	2.5333	20 35 40.5	11.538	19	16 45 54.67	2.7934	26 40 53.3	3.072
20	14 39 23.90	2.5411	20 47 8.8	11.405	20	16 48 42.32	2.7949	26 43 51.4	2.865
21	14 41 56.60	2.5488	20 58 29.1	11.269	21	16 51 30.06	2.7963	26 46 37.1	2.658
22	14 44 29.76	2.5565	21 9 41.1	11.131	22	16 54 17.87	2.7973	26 49 10.4	2.451
23	14 47 3.38	2.5641	21 20 44.8	10.991	23	16 57 5.73	2.7981	26 51 31.2	2.243
24	14 49 37.45	2.5717	S. 21 31 40.0	10.848	24	16 59 53.64	2.7987	S. 26 53 39.6	2.035

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	
TUESDAY 9.					THURSDAY 11.				
0	h m s	s	° ' "	"	0	h m s	s	° ' "	
0	16 59 53.64	2.7987	S. 26 53 39.6	2.035	0	19 11 4.97	2.6009	S. 24 39 56.5	
1	17 2 41.58	2.7991	26 55 35.4	1.827	1	19 13 40.79	2.5933	24 32 38.7	
2	17 5 29.53	2.7993	26 57 18.8	1.618	2	19 16 16.16	2.5856	24 25 11.4	
3	17 8 17.49	2.7993	26 58 49.6	1.410	3	19 18 51.06	2.5778	24 17 34.7	
4	17 11 5.44	2.7990	27 0 8.0	1.202	4	19 21 25.49	2.5699	24 9 48.6	
5	17 13 53.37	2.7985	27 1 13.8	0.993	5	19 23 59.45	2.5621	24 1 53.3	
6	17 16 41.26	2.7978	27 2 7.1	0.785	6	19 26 32.94	2.5541	23 53 48.9	
7	17 19 29.11	2.7970	27 2 48.0	0.578	7	19 29 5.94	2.5460	23 45 35.5	
8	17 22 16.90	2.7958	27 3 16.4	0.369	8	19 31 38.46	2.5379	23 37 13.1	
9	17 25 4.61	2.7945	27 3 32.3	-0.162	9	19 34 10.49	2.5298	23 28 42.0	
10	17 27 52.24	2.7930	27 3 35.8	+0.046	10	19 36 42.03	2.5216	23 20 2.3	
11	17 30 39.77	2.7913	27 3 26.8	0.253	11	19 39 13.08	2.5134	23 11 14.0	
12	17 33 27.19	2.7893	27 3 5.4	0.460	12	19 41 43.64	2.5052	23 2 17.3	
13	17 36 14.48	2.7871	27 2 31.6	0.666	13	19 44 13.70	2.4968	22 53 12.3	
14	17 39 1.64	2.7848	27 1 45.5	0.871	14	19 46 43.26	2.4886	22 43 59.1	
15	17 41 48.65	2.7822	27 0 47.1	1.076	15	19 49 12.33	2.4803	22 34 37.8	
16	17 44 35.50	2.7793	26 59 36.4	1.280	16	19 51 40.89	2.4719	22 25 8.6	
17	17 47 22.17	2.7763	26 58 13.5	1.483	17	19 54 8.96	2.4636	22 15 31.5	
18	17 50 8.66	2.7732	26 56 38.4	1.687	18	19 56 36.52	2.4552	22 5 46.7	
19	17 52 54.95	2.7698	26 54 51.1	1.889	19	19 59 3.58	2.4468	21 55 54.3	
20	17 55 41.04	2.7663	26 52 51.7	2.090	20	20 1 30.14	2.4385	21 45 54.3	
21	17 58 26.90	2.7624	26 50 40.3	2.291	21	20 3 56.20	2.4301	21 35 47.0	
22	18 1 12.53	2.7585	26 48 16.8	2.491	22	20 6 21.75	2.4217	21 25 32.4	
23	18 3 57.92	2.7544	S. 26 45 41.4	2.688	23	20 8 46.80	2.4133	S. 21 15 10.6	
WEDNESDAY 10.					FRIDAY 12.				
0	h m s	s	° ' "	"	0	h m s	s	° ' "	
0	18 6 43.06	2.7501	S. 26 42 54.2	2.886	0	20 11 11.35	2.4049	S. 21 4 41.8	
1	18 9 27.93	2.7455	26 39 55.1	3.083	1	20 13 35.39	2.3966	20 54 6.1	
2	18 12 12.52	2.7408	26 36 44.3	3.278	2	20 15 58.94	2.3883	20 43 23.5	
3	18 14 56.82	2.7359	26 33 21.8	3.472	3	20 18 21.99	2.3800	20 32 34.3	
4	18 17 40.83	2.7309	26 29 47.7	3.664	4	20 20 44.54	2.3718	20 21 38.5	
5	18 20 24.53	2.7258	26 26 2.1	3.856	5	20 23 6.60	2.3635	20 10 36.2	
6	18 23 7.92	2.7204	26 22 5.0	4.046	6	20 25 28.16	2.3552	19 59 27.5	
7	18 25 50.98	2.7148	26 17 56.6	4.235	7	20 27 49.22	2.3469	19 48 12.6	
8	18 28 33.70	2.7092	26 13 36.8	4.423	8	20 30 9.79	2.3388	19 36 51.5	
9	18 31 16.08	2.7034	26 9 5.8	4.609	9	20 32 29.88	2.3308	19 25 24.4	
10	18 33 58.11	2.6975	26 4 23.7	4.794	10	20 34 49.48	2.3226	19 13 51.4	
11	18 36 39.78	2.6913	25 59 30.5	4.978	11	20 37 8.59	2.3145	19 2 12.5	
12	18 39 21.07	2.6850	25 54 26.3	5.160	12	20 39 27.22	2.3065	18 50 28.0	
13	18 42 1.98	2.6787	25 49 11.3	5.340	13	20 41 45.37	2.2985	18 38 37.8	
14	18 44 42.51	2.6722	25 43 45.5	5.519	14	20 44 3.04	2.2906	18 26 42.1	
15	18 47 22.64	2.6655	25 38 9.0	5.696	15	20 46 20.24	2.2828	18 14 41.1	
16	18 50 2.37	2.6588	25 32 22.0	5.872	16	20 48 36.97	2.2749	18 2 34.8	
17	18 52 41.69	2.6519	25 26 24.4	6.046	17	20 50 53.23	2.2671	17 50 23.3	
18	18 55 20.60	2.6449	25 20 16.5	6.218	18	20 53 9.02	2.2593	17 38 6.8	
19	18 57 59.08	2.6378	25 13 58.3	6.388	19	20 55 24.35	2.2517	17 25 45.3	
20	19 0 37.14	2.6307	25 7 29.9	6.558	20	20 57 39.22	2.2441	17 13 19.0	
21	19 3 14.76	2.6233	25 0 51.4	6.725	21	20 59 53.64	2.2366	17 0 48.0	
22	19 5 51.94	2.6160	24 54 2.9	6.890	22	21 2 7.61	2.2291	16 48 12.3	
23	19 8 28.68	2.6086	24 47 4.6	7.053	23	21 4 21.13	2.2216	16 35 32.1	
24	19 11 4.97	2.6009	S. 24 39 56.5	7.216	24	21 6 34.20	2.2143	S. 16 22 47.4	

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
SATURDAY 13.				MONDAY 15.				
m s	s	° ' "	"	h m s	s	° ' "	"	
6 34.20	2.2143	S. 16 22 47.4	12.782	0 22 45 50.37	1.9541	S. 5 13 2.8	14.614	
8 46.84	2.2070	16 9 58.3	12.853	1 22 47 47.51	1.9508	4 58 25.7	14.623	
10 59.04	2.1998	15 57 5.0	12.923	2 22 49 44.46	1.9476	4 43 48.1	14.629	
13 10.81	2.1926	15 44 7.5	12.992	3 22 51 41.22	1.9444	4 29 10.2	14.635	
15 22.15	2.1855	15 31 6.0	13.058	4 22 53 37.79	1.9413	4 14 31.9	14.640	
17 33.07	2.1785	15 18 0.5	13.124	5 22 55 34.18	1.9383	3 59 53.4	14.643	
19 43.57	2.1716	15 4 51.1	13.188	6 22 57 30.39	1.9354	3 45 14.7	14.647	
21 53.66	2.1648	14 51 37.9	13.250	7 22 59 26.43	1.9326	3 30 35.8	14.649	
24 3.34	2.1579	14 38 21.1	13.310	8 23 1 22.30	1.9298	3 15 56.8	14.650	
26 12.61	2.1512	14 25 0.7	13.369	9 23 3 18.01	1.9272	3 1 17.8	14.650	
28 21.48	2.1445	14 11 36.8	13.427	10 23 5 13.56	1.9247	2 46 38.8	14.649	
30 29.95	2.1379	13 58 9.5	13.483	11 23 7 8.97	1.9223	2 31 59.9	14.647	
32 38.03	2.1315	13 44 38.8	13.538	12 23 9 4.23	1.9198	2 17 21.2	14.643	
34 45.73	2.1251	13 31 4.9	13.591	13 23 10 59.35	1.9175	2 2 42.7	14.639	
36 53.04	2.1188	13 17 27.9	13.642	14 23 12 54.33	1.9153	1 48 4.5	14.634	
38 59.98	2.1125	13 3 47.9	13.692	15 23 14 49.18	1.9132	1 33 26.6	14.628	
41 6.74	2.1063	12 50 4.9	13.741	16 23 16 43.91	1.9111	1 18 49.1	14.621	
43 12.74	2.1003	12 36 19.0	13.788	17 23 18 38.51	1.9091	1 4 12.1	14.613	
45 18.57	2.0943	12 22 30.3	13.834	18 23 20 33.00	1.9072	0 49 35.5	14.605	
47 24.05	2.0884	12 8 38.9	13.878	19 23 22 27.37	1.9053	0 34 59.5	14.595	
49 29.18	2.0826	11 54 44.9	13.922	20 23 24 21.64	1.9036	0 20 24.1	14.585	
51 33.96	2.0768	11 40 48.3	13.963	21 23 26 15.80	1.9019	S. 0 5 49.3	14.573	
53 38.39	2.0711	11 26 49.3	14.003	22 23 28 9.87	1.9004	N. 0 8 44.7	14.560	
55 42.49	2.0655	S. 11 12 47.9	14.043	23 23 30 3.85	1.8989	N. 0 23 17.9	14.547	
SUNDAY 14.				TUESDAY 16.				
57 46.25	2.0600	S. 10 58 44.2	14.080	0 23 31 57.74	1.8975	N. 0 37 50.3	14.533	
59 49.69	2.0546	10 44 38.3	14.116	1 23 33 51.55	1.8962	0 52 21.8	14.518	
1 52.80	2.0493	10 30 30.3	14.151	2 23 35 45.28	1.8949	1 6 52.4	14.502	
3 55.60	2.0440	10 16 20.2	14.185	3 23 37 38.94	1.8938	1 21 22.0	14.484	
5 58.08	2.0388	10 2 8.1	14.218	4 23 39 32.53	1.8926	1 35 50.5	14.466	
8 0.26	2.0338	9 47 54.1	14.248	5 23 41 26.05	1.8915	1 50 17.9	14.448	
10 2.14	2.0288	9 33 38.3	14.278	6 23 43 19.51	1.8906	2 4 44.2	14.428	
12 3.72	2.0239	9 19 20.8	14.307	7 23 45 12.92	1.8898	2 19 9.3	14.408	
14 5.01	2.0191	9 5 1.5	14.335	8 23 47 6.28	1.8890	2 33 33.1	14.386	
16 6.74	2.0144	8 50 40.6	14.361	9 23 48 59.60	1.8883	2 47 55.6	14.364	
18 6.74	2.0098	8 36 18.2	14.386	10 23 50 52.87	1.8876	3 2 16.8	14.341	
20 7.19	2.0053	8 21 54.3	14.409	11 23 52 46.11	1.8870	3 16 36.5	14.317	
22 7.37	2.0008	8 7 29.1	14.432	12 23 54 39.31	1.8865	3 30 54.8	14.292	
24 7.29	1.9964	7 53 2.5	14.453	13 23 56 32.49	1.8861	3 45 11.5	14.266	
26 6.94	1.9921	7 38 34.7	14.473	14 23 58 25.64	1.8858	3 59 26.7	14.239	
28 6.34	1.9879	7 24 5.7	14.493	15 0 0 18.78	1.8855	4 13 40.2	14.212	
30 5.49	1.9838	7 9 35.6	14.511	16 0 2 11.90	1.8853	4 27 52.1	14.184	
32 4.40	1.9798	6 55 4.4	14.528	17 0 4 5.01	1.8852	4 42 2.3	14.154	
34 3.07	1.9759	6 40 32.3	14.543	18 0 5 58.12	1.8851	4 56 10.6	14.123	
36 1.51	1.9721	6 25 59.3	14.558	19 0 7 51.22	1.8851	5 10 17.1	14.093	
37 59.72	1.9683	6 11 25.4	14.571	20 0 9 44.33	1.8852	5 24 21.8	14.062	
39 57.70	1.9646	5 56 50.8	14.583	21 0 11 37.44	1.8853	5 38 24.5	14.029	
41 55.47	1.9610	5 42 15.4	14.593	22 0 13 30.56	1.8855	5 52 25.3	13.996	
43 53.02	1.9575	5 27 39.4	14.605	23 0 15 23.70	1.8858	6 6 24.0	13.961	
45 50.37	1.9541	S. 5 13 2.8	14.614	24 0 17 16.86	1.8863	N. 6 20 20.6	13.926	

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.
WEDNESDAY 17.					FRIDAY 19.			
0	h m s	s	" ' "	"	0	h m s	s	" ' "
0	17 16.86	1.8863	N. 6 20 20.6	13.926	0	1 49 23.62	1.9719	N. 16 32 33.5
1	19 10.05	1.8867	6 34 15.1	13.890	1	51 22.02	1.9748	16 43 47.1
2	21 3.26	1.8872	6 48 7.4	13.853	2	53 20.60	1.9778	16 54 56.1
3	22 56.51	1.8878	7 1 57.5	13.816	3	55 19.36	1.9808	17 6 0.5
4	24 49.79	1.8883	7 15 45.3	13.777	4	57 18.30	1.9838	17 17 0.3
5	26 43.11	1.8890	7 29 30.7	13.738	5	59 17.42	1.9868	17 27 55.3
6	28 36.47	1.8898	7 43 13.8	13.698	6	2 16.72	1.9898	17 38 45.6
7	30 29.88	1.8906	7 56 54.4	13.657	7	3 16.20	1.9929	17 49 31.1
8	32 23.34	1.8915	8 10 32.6	13.616	8	5 15.87	1.9960	18 0 11.7
9	34 16.86	1.8925	8 24 8.3	13.573	9	7 15.72	1.9992	18 10 47.4
10	36 10.44	1.8935	8 37 41.4	13.529	10	9 15.77	2.0023	18 21 18.1
11	38 4.08	1.8946	8 51 11.8	13.484	11	11 16.00	2.0054	18 31 43.8
12	39 57.79	1.8958	9 4 39.5	13.439	12	13 16.42	2.0086	18 42 4.5
13	41 51.57	1.8969	9 18 4.5	13.393	13	15 17.03	2.0118	18 52 20.0
14	43 45.47	1.8982	9 31 26.7	13.347	14	17 17.84	2.0151	19 2 30.4
15	45 39.35	1.8995	9 44 46.1	13.300	15	19 18.84	2.0183	19 12 35.6
16	47 33.36	1.9008	9 58 2.7	13.252	16	21 20.04	2.0216	19 22 35.5
17	49 27.45	1.9023	10 11 16.3	13.202	17	23 21.43	2.0248	19 32 30.1
18	51 21.63	1.9038	10 24 26.9	13.152	18	25 23.02	2.0282	19 42 19.4
19	53 15.91	1.9054	10 37 34.5	13.101	19	27 24.81	2.0314	19 52 3.3
20	55 10.28	1.9069	10 50 39.0	13.049	20	29 26.79	2.0347	20 1 41.7
21	57 4.74	1.9086	11 3 40.4	12.997	21	31 28.97	2.0380	20 11 14.6
22	58 59.31	1.9103	11 16 38.6	12.943	22	33 31.35	2.0413	20 20 41.9
23	1 0 53.98	1.9121	N. 11 29 33.6	12.889	23	35 33.93	2.0447	N. 20 30 3.7
THURSDAY 18.					SATURDAY 20.			
0	1 2 48.76	1.9139	N. 11 42 25.3	12.834	0	2 37 36.71	2.0480	N. 20 39 19.8
1	4 43.65	1.9158	11 55 13.7	12.778	1	39 39.69	2.0513	20 48 30.3
2	6 38.66	1.9178	12 7 58.7	12.721	2	41 42.87	2.0547	20 57 35.0
3	8 33.79	1.9198	12 20 40.2	12.663	3	43 46.25	2.0579	21 6 33.9
4	10 29.03	1.9218	12 33 18.3	12.606	4	45 49.82	2.0613	21 15 27.0
5	12 24.40	1.9239	12 45 52.9	12.547	5	47 53.60	2.0647	21 24 14.3
6	14 19.90	1.9261	12 58 23.9	12.487	6	49 57.58	2.0679	21 32 55.6
7	16 15.53	1.9283	13 10 51.3	12.426	7	52 1.75	2.0713	21 41 31.0
8	18 11.29	1.9304	13 23 15.0	12.364	8	54 6.13	2.0747	21 50 0.3
9	20 7.18	1.9327	13 35 35.0	12.302	9	56 10.71	2.0779	21 58 23.6
10	22 3.21	1.9351	13 47 51.2	12.238	10	58 15.48	2.0812	22 6 40.8
11	23 59.39	1.9375	14 0 3.5	12.173	11	3 20.45	2.0845	22 14 51.9
12	25 55.71	1.9398	14 12 12.0	12.109	12	3 25.62	2.0878	22 22 56.8
13	27 52.17	1.9423	14 24 16.6	12.043	13	3 30.99	2.0911	22 30 55.5
14	29 48.78	1.9448	14 36 17.2	11.976	14	3 36.55	2.0943	22 38 47.9
15	31 45.55	1.9474	14 48 13.7	11.908	15	3 42.30	2.0974	22 46 34.0
16	33 42.47	1.9499	15 0 6.2	11.840	16	3 48.24	2.1007	22 54 13.7
17	35 39.54	1.9525	15 11 54.5	11.771	17	3 54.38	2.1039	23 1 47.0
18	37 36.77	1.9552	15 23 38.7	11.702	18	3 59.71	2.1071	23 9 13.9
19	39 34.16	1.9579	15 35 18.7	11.631	19	3 17.23	2.1103	23 16 34.3
20	41 31.72	1.9607	15 46 54.4	11.559	20	3 19.94	2.1133	23 23 48.2
21	43 29.44	1.9634	15 58 25.8	11.487	21	3 21.83	2.1164	23 30 55.5
22	45 27.33	1.9663	16 9 52.8	11.413	22	3 23.79	2.1195	23 37 56.2
23	47 25.39	1.9691	16 21 15.4	11.339	23	3 25.35	2.1226	23 44 50.2
24	49 23.62	1.9719	N. 16 32 33.5	11.264	24	3 27 42.62	2.1257	N. 23 51 37.6

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
SUNDAY 21.					TUESDAY 23.				
0	h m s	s	"	"	0	h m s	s	"	"
0	3 27 42.62	2.1257	N. 23 51 37.6	6.734	0	5 12 21.47	2.2122	N. 26 56 14.7	0.813
1	3 29 50.25	2.1286	23 58 18.3	6.622	1	5 14 34.21	2.2134	26 56 59.6	0.683
2	3 31 58.05	2.1315	24 4 52.2	6.508	2	5 16 46.96	2.2126	26 57 36.7	0.553
3	3 34 6.03	2.1345	24 11 19.3	6.395	3	5 18 59.72	2.2127	26 58 6.0	0.423
4	3 36 14.19	2.1374	24 17 39.6	6.281	4	5 21 12.48	2.2126	26 58 27.5	0.294
5	3 38 22.52	2.1403	24 23 53.0	6.166	5	5 23 25.23	2.2124	26 58 41.3	0.164
6	3 40 31.02	2.1430	24 29 59.5	6.051	6	5 25 37.97	2.2123	26 58 47.2	+0.033
7	3 42 39.68	2.1458	24 35 59.1	5.934	7	5 27 50.70	2.2121	26 58 45.3	-0.097
8	3 44 48.51	2.1486	24 41 51.6	5.818	8	5 30 3.42	2.2118	26 58 35.6	0.226
9	3 46 57.51	2.1513	24 47 37.2	5.701	9	5 32 16.12	2.2114	26 58 18.2	0.356
10	3 49 6.66	2.1538	24 53 15.7	5.583	10	5 34 28.79	2.2109	26 57 52.9	0.486
11	3 51 15.97	2.1565	24 58 47.2	5.465	11	5 36 41.43	2.2104	26 57 19.9	0.615
12	3 53 25.44	2.1591	25 4 11.5	5.346	12	5 38 54.04	2.2098	26 56 39.1	0.745
13	3 55 35.06	2.1616	25 9 28.7	5.227	13	5 41 6.61	2.2092	26 55 50.5	0.874
14	3 57 44.83	2.1640	25 14 38.7	5.108	14	5 43 19.14	2.2084	26 54 54.2	1.003
15	3 59 54.74	2.1664	25 19 41.6	4.988	15	5 45 31.62	2.2076	26 53 50.1	1.133
16	4 2 4.80	2.1688	25 24 37.2	4.866	16	5 47 44.05	2.2068	26 52 38.3	1.262
17	4 4 15.00	2.1712	25 29 25.5	4.744	17	5 49 56.43	2.2058	26 51 18.7	1.391
18	4 6 25.34	2.1734	25 34 6.5	4.623	18	5 52 8.74	2.2047	26 49 51.4	1.519
19	4 8 35.81	2.1757	25 38 40.2	4.501	19	5 54 20.99	2.2037	26 48 16.4	1.648
20	4 10 46.42	2.1778	25 43 6.6	4.378	20	5 56 33.18	2.2025	26 46 33.7	1.776
21	4 12 57.15	2.1799	25 47 25.6	4.255	21	5 58 45.29	2.2013	26 44 43.3	1.904
22	4 15 8.01	2.1820	25 51 37.2	4.131	22	6 0 57.33	2.1999	26 42 45.2	2.032
23	4 17 18.99	2.1839	N. 25 55 41.3	4.007	23	6 3 9.28	2.1985	N. 26 40 39.5	2.158
MONDAY 22.					WEDNESDAY 24.				
0	4 19 30.08	2.1858	N. 25 59 38.0	3.883	0	6 5 21.15	2.1972	N. 26 38 26.2	2.286
1	4 21 41.28	2.1877	26 3 27.2	3.758	1	6 7 32.94	2.1957	26 36 5.2	2.413
2	4 23 52.60	2.1895	26 7 9.0	3.633	2	6 9 44.63	2.1941	26 33 36.7	2.539
3	4 26 4.02	2.1913	26 10 43.2	3.507	3	6 11 56.23	2.1925	26 31 0.5	2.666
4	4 28 15.55	2.1930	26 14 9.8	3.381	4	6 14 7.73	2.1908	26 28 16.8	2.791
5	4 30 27.18	2.1946	26 17 28.9	3.256	5	6 16 19.12	2.1890	26 25 25.6	2.917
6	4 32 38.90	2.1961	26 20 40.5	3.129	6	6 18 30.41	2.1873	26 22 26.8	3.043
7	4 34 50.71	2.1976	26 23 44.4	3.002	7	6 20 41.59	2.1854	26 19 20.5	3.168
8	4 37 2.61	2.1990	26 26 40.7	2.875	8	6 22 52.66	2.1836	26 16 6.7	3.292
9	4 39 14.59	2.2003	26 29 20.4	2.748	9	6 25 3.62	2.1816	26 12 45.5	3.416
10	4 41 26.65	2.2017	26 32 10.4	2.620	10	6 27 14.45	2.1795	26 9 16.8	3.540
11	4 43 38.79	2.2029	26 34 43.8	2.493	11	6 29 25.16	2.1774	26 5 40.7	3.663
12	4 45 51.00	2.2040	26 37 9.5	2.364	12	6 31 35.74	2.1753	26 1 57.2	3.787
13	4 48 3.27	2.2051	26 39 27.5	2.236	13	6 33 46.19	2.1731	25 58 6.3	3.909
14	4 50 15.61	2.2062	26 41 37.8	2.108	14	6 35 56.51	2.1709	25 54 8.1	4.032
15	4 52 28.01	2.2071	26 43 40.4	1.979	15	6 38 6.70	2.1686	25 50 2.5	4.153
16	4 54 40.46	2.2079	26 45 35.3	1.850	16	6 40 16.74	2.1662	25 45 49.7	4.274
17	4 56 52.96	2.2087	26 47 22.4	1.720	17	6 42 26.64	2.1638	25 41 29.6	4.395
18	4 59 5.50	2.2094	26 49 1.7	1.591	18	6 44 36.40	2.1615	25 37 2.3	4.515
19	5 1 18.09	2.2102	26 50 33.3	1.462	19	6 46 46.02	2.1590	25 32 27.8	4.635
20	5 3 30.71	2.2106	26 51 57.1	1.333	20	6 48 55.48	2.1564	25 27 46.1	4.755
21	5 5 43.36	2.2111	26 53 13.2	1.203	21	6 51 4.79	2.1538	25 22 57.2	4.874
22	5 7 56.04	2.2116	26 54 21.5	1.073	22	6 53 13.94	2.1512	25 18 1.2	4.993
23	5 10 8.75	2.2119	26 55 22.0	0.943	23	6 55 22.93	2.1486	25 12 58.1	5.110
24	5 12 21.47	2.2122	N. 26 56 14.7	0.813	24	6 57 31.77	2.1459	N. 25 7 48.0	5.228

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.
THURSDAY 25.					SATURDAY 27.			
0	h m s	s	"	"	0	h m s	s	"
0	6 57 31.77	2.1459	N. 25 7 48.0	5.298	0	8 37 4.20	2.0006	N. 18 52 56.1
1	6 59 40.44	2.1432	25 2 30.8	5.344	1	8 39 4.15	1.9978	18 42 44.8
2	7 1 48.95	2.1405	24 57 6.7	5.460	2	8 41 3.94	1.9951	18 32 28.4
3	7 3 57.30	2.1378	24 51 35.6	5.577	3	8 43 3.56	1.9923	18 22 6.8
4	7 6 5.48	2.1349	24 45 57.5	5.692	4	8 45 3.01	1.9895	18 11 40.2
5	7 8 13.49	2.1320	24 40 12.6	5.806	5	8 47 2.30	1.9868	18 1 8.5
6	7 10 21.32	2.1291	24 34 20.8	5.920	6	8 49 1.43	1.9842	17 50 31.8
7	7 12 28.98	2.1263	24 28 22.2	6.033	7	8 51 0.40	1.9816	17 39 50.2
8	7 14 36.47	2.1233	24 22 16.8	6.147	8	8 52 59.22	1.9790	17 29 3.7
9	7 16 43.78	2.1204	24 16 4.6	6.259	9	8 54 57.88	1.9764	17 18 12.4
10	7 18 50.92	2.1174	24 9 45.7	6.371	10	8 56 56.39	1.9739	17 7 16.2
11	7 20 57.87	2.1143	24 3 20.1	6.483	11	8 58 54.75	1.9714	16 56 15.2
12	7 23 4.64	2.1113	23 56 47.8	6.593	12	9 0 52.96	1.9690	16 45 9.5
13	7 25 11.23	2.1083	23 50 8.9	6.703	13	9 2 51.03	1.9666	16 33 59.1
14	7 27 17.64	2.1053	23 43 23.5	6.812	14	9 4 48.95	1.9642	16 22 44.1
15	7 29 23.86	2.1022	23 36 31.5	6.921	15	9 6 46.73	1.9619	16 11 24.4
16	7 31 29.90	2.0991	23 29 33.0	7.029	16	9 8 44.38	1.9597	16 0 0.1
17	7 33 35.75	2.0960	23 22 28.0	7.138	17	9 10 41.90	1.9575	15 48 31.3
18	7 35 41.42	2.0929	23 15 16.5	7.244	18	9 12 39.28	1.9553	15 36 58.0
19	7 37 46.90	2.0898	23 7 58.7	7.350	19	9 14 36.54	1.9533	15 25 20.3
20	7 39 52.19	2.0866	23 0 34.5	7.456	20	9 16 33.67	1.9511	15 13 38.2
21	7 41 57.29	2.0834	22 53 4.0	7.561	21	9 18 30.67	1.9491	15 1 51.7
22	7 44 2.20	2.0803	22 45 27.2	7.665	22	9 20 27.56	1.9472	14 50 0.8
23	7 46 6.92	2.0772	N. 22 37 44.2	7.768	23	9 22 24.33	1.9453	N. 14 38 5.7
FRIDAY 26.					SUNDAY 28.			
0	7 48 11.46	2.0740	N. 22 29 55.0	7.872	0	9 24 20.99	1.9433	N. 14 26 6.4
1	7 50 15.80	2.0708	22 21 59.6	7.974	1	9 26 17.53	1.9415	14 14 2.8
2	7 52 19.96	2.0677	22 13 58.1	8.076	2	9 28 13.97	1.9398	14 1 55.1
3	7 54 23.92	2.0645	22 5 50.5	8.177	3	9 30 10.31	1.9381	13 49 43.3
4	7 56 27.70	2.0614	21 57 36.9	8.278	4	9 32 6.54	1.9363	13 37 27.4
5	7 58 31.29	2.0582	21 49 17.2	8.378	5	9 34 2.67	1.9348	13 25 7.4
6	8 0 34.68	2.0550	21 40 51.6	8.476	6	9 35 58.71	1.9333	13 12 43.5
7	8 2 37.89	2.0519	21 32 20.1	8.574	7	9 37 54.66	1.9318	13 0 15.6
8	8 4 40.91	2.0488	21 23 42.7	8.673	8	9 39 50.52	1.9303	12 47 43.8
9	8 6 43.74	2.0456	21 14 59.4	8.770	9	9 41 46.29	1.9289	12 35 8.1
10	8 8 46.38	2.0425	21 6 10.3	8.866	10	9 43 41.99	1.9277	12 22 28.6
11	8 10 48.84	2.0394	20 57 15.5	8.962	11	9 45 37.61	1.9264	12 9 45.3
12	8 12 51.11	2.0363	20 48 14.9	9.058	12	9 47 33.16	1.9252	11 56 58.3
13	8 14 53.19	2.0332	20 39 8.6	9.152	13	9 49 28.63	1.9240	11 44 7.6
14	8 16 55.09	2.0302	20 29 56.7	9.245	14	9 51 24.04	1.9230	11 31 13.2
15	8 18 56.81	2.0272	20 20 39.2	9.338	15	9 53 19.39	1.9220	11 18 15.2
16	8 20 58.35	2.0241	20 11 16.1	9.431	16	9 55 14.68	1.9210	11 5 13.6
17	8 22 59.70	2.0210	20 1 47.5	9.523	17	9 57 9.91	1.9201	10 52 8.5
18	8 25 0.87	2.0180	19 52 13.4	9.613	18	9 59 5.09	1.9193	10 38 59.9
19	8 27 1.86	2.0151	19 42 33.9	9.703	19	10 1 0.23	1.9186	10 25 47.9
20	8 29 2.68	2.0122	19 32 49.0	9.793	20	10 2 55.32	1.9178	10 12 32.4
21	8 31 3.32	2.0093	19 22 58.7	9.883	21	10 4 50.37	1.9173	9 59 13.6
22	8 33 3.79	2.0063	19 13 3.1	9.971	22	10 6 45.39	1.9168	9 45 51.5
23	8 35 4.08	2.0034	19 3 2.2	10.058	23	10 8 40.38	1.9163	9 32 26.1
24	8 37 4.20	2.0006	N. 18 52 56.1	10.145	24	10 10 35.34	1.9158	N. 9 18 57.4

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
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MONDAY 29.				WEDNESDAY, DECEMBER 1.				
m	s	s	"	h	m	s	"	"
10	35.34	1.9158	N. 9 18 57.4	13	50.4			
12	30.27	1.9154	9 5 25.6	13	55.7			
14	25.19	1.9152	8 51 50.6	13	60.9			
16	20.09	1.9149	8 38 12.5	13	66.0			
18	14.98	1.9148	8 24 31.4	13	71.1			
20	9.87	1.9147	8 10 47.2	13	76.1			
22	4.75	1.9148	7 57 0.1	13	80.9			
23	59.64	1.9149	7 43 10.1	13	85.8			
25	54.54	1.9151	7 29 17.2	13	90.6			
27	49.45	1.9153	7 15 21.4	13	95.3			
29	44.37	1.9155	7 1 22.9	13	99.8			
31	39.31	1.9159	6 47 21.6	14	0.44			
33	34.28	1.9164	6 33 17.6	14	0.88			
35	29.28	1.9169	6 19 11.0	14	1.32			
37	24.31	1.9175	6 5 1.8	14	1.75			
39	19.38	1.9182	5 50 50.0	14	2.18			
41	14.49	1.9189	5 36 35.7	14	2.58			
43	9.65	1.9198	5 22 19.0	14	2.99			
45	4.87	1.9208	5 7 59.8	14	3.39			
47	0.15	1.9218	4 53 38.3	14	3.78			
48	55.48	1.9228	4 39 14.5	14	4.16			
50	50.88	1.9240	4 24 48.4	14	4.53			
52	46.36	1.9253	4 10 20.1	14	4.90			
54	41.91	1.9265	N. 3 55 49.6	14	5.26			

TUESDAY 30.				PHASES OF THE MOON.				
m	s	s	"	d	h	m		
56	37.54	1.9279	N. 3 41 17.0	● New Moon	Nov.	6 19 52.3		
58	33.26	1.9294	3 26 42.3	☾ First Quarter		13 11 3.0		
0	29.07	1.9309	3 12 5.6	○ Full Moon		21 5 36.4		
2	24.97	1.9326	2 57 27.0	☾ Last Quarter		29 10 10.5		
4	20.98	1.9344	2 42 46.5					
6	17.10	1.9363	2 28 4.1					
8	13.33	1.9381	2 13 19.9					
10	9.67	1.9400	1 58 33.9	☾ Perigee	Nov.	8 2.3		
12	6.13	1.9421	1 43 46.2	☾ Apogee		23 11.7		
14	2.72	1.9443	1 28 56.9					
15	59.45	1.9466	1 14 6.0					
17	56.31	1.9488	0 59 13.6					
19	53.31	1.9513	0 44 19.8					
21	50.46	1.9538	0 29 24.5					
23	47.76	1.9563	N. 0 14 27.9					
25	45.22	1.9591	S. 0 0 30.1					
27	42.85	1.9619	0 15 29.3					
29	40.65	1.9648	0 30 29.6					
31	38.62	1.9677	0 45 31.1					
33	36.77	1.9707	1 0 33.7					
35	35.10	1.9738	1 15 37.2					
37	33.63	1.9771	1 30 41.7					
39	32.35	1.9803	1 45 47.1					
41	31.27	1.9838	2 0 53.2					
43	30.40	1.9873	S. 2 16 0.1					

AT GREENWICH APPARENT NOON.

Day of the Week.	Day of the Month.	THE SUN'S					Sideral Time of Semidiameter Passing Meridian.	Equation of Time, to be Subtracted from	
		Apparent Right Ascension.	Diff. for 1 Hour.	Apparent Declination.	Diff. for 1 Hour.	Semidiameter.		Added to Apparent Time.	
		h m s	s	° ' "	"	' "	s	m s	
Wed.	1	16 25 48.24	10.776	S.21 41 13.5	-24.19	16 15.20	70.18	11 12.79	
Thur.	2	16 30 7.20	10.804	21 50 41.6	23.15	16 15.35	70.26	10 50.44	
Fri.	3	16 34 26.83	10.831	21 59 44.6	22.10	16 15.50	70.35	10 27.44	
Sat.	4	16 38 47.09	10.857	22 8 22.2	-21.03	16 15.64	70.43	10 3.80	
SUN.	5	16 43 7.96	10.882	22 16 34.1	19.95	16 15.78	70.51	9 39.55	
Mon.	6	16 47 29.42	10.905	22 24 20.0	18.87	16 15.92	70.59	9 14.72	
Tues.	7	16 51 51.42	10.927	22 31 39.7	-17.77	16 16.05	70.66	8 49.35	
Wed.	8	16 56 13.94	10.948	22 38 32.9	16.66	16 16.18	70.73	8 23.46	
Thur.	9	17 0 36.94	10.968	22 44 59.4	15.54	16 16.31	70.80	7 57.09	
Fri.	10	17 5 0.40	10.986	22 50 59.0	-14.42	16 16.43	70.86	7 30.26	
Sat.	11	17 9 24.28	11.003	22 56 31.6	13.29	16 16.55	70.92	7 3.02	
SUN.	12	17 13 48.54	11.018	23 1 36.9	12.15	16 16.66	70.97	6 35.38	
Mon.	13	17 18 13.16	11.032	23 6 14.8	-11.01	16 16.77	71.02	6 7.40	
Tues.	14	17 22 38.11	11.045	23 10 25.1	9.86	16 16.88	71.06	5 39.09	
Wed.	15	17 27 3.35	11.057	23 14 7.8	8.70	16 16.99	71.10	5 10.49	
Thur.	16	17 31 28.85	11.067	23 17 22.7	-7.54	16 17.09	71.13	4 41.63	
Fri.	17	17 35 54.58	11.076	23 20 9.7	6.37	16 17.18	71.16	4 12.53	
Sat.	18	17 40 20.52	11.084	23 22 28.7	5.21	16 17.27	71.18	3 43.23	
SUN.	19	17 44 46.64	11.091	23 24 19.6	-4.04	16 17.35	71.21	3 13.76	
Mon.	20	17 49 12.89	11.096	23 25 42.4	2.86	16 17.42	71.23	2 44.14	
Tues.	21	17 53 39.25	11.100	23 26 37.0	1.69	16 17.48	71.25	2 14.42	
Wed.	22	17 58 5.70	11.103	23 27 3.4	-0.51	16 17.54	71.26	1 44.61	
Thur.	23	18 2 32.20	11.104	23 27 1.4	+0.67	16 17.60	71.26	1 14.76	
Fri.	24	18 6 58.71	11.104	23 26 31.3	1.85	16 17.65	71.26	0 44.88	
Sat.	25	18 11 25.21	11.103	23 25 32.8	+3.02	16 17.69	71.25	0 15.02	
SUN.	26	18 15 51.67	11.101	23 24 6.1	4.20	16 17.73	71.24	0 14.79	
Mon.	27	18 20 18.05	11.097	23 22 11.1	5.38	16 17.76	71.23	0 44.54	
Tues.	28	18 24 44.33	11.092	23 19 47.9	+6.55	16 17.79	71.21	1 14.17	
Wed.	29	18 29 10.47	11.086	23 16 56.6	7.72	16 17.81	71.19	1 43.67	
Thur.	30	18 33 36.44	11.078	23 13 37.2	8.89	16 17.82	71.16	2 13.00	
Fri.	31	18 38 2.20	11.068	23 9 49.7	10.06	16 17.83	71.13	2 42.12	
Sat.	32	18 42 27.72	11.057	S.23 5 34.4	+11.22	16 17.84	71.09	3 11.01	

NOTE.—The mean time of semidiameter passing the meridian may be found by subtracting 0.19 from the time.

The sign — prefixed to the hourly change of declination indicates that south declinations are increasing; sign + indicates that south declinations are decreasing.

AT GREENWICH MEAN NOON.

Day of the Week.	Day of the Month.	THE SUN'S				Equation of Time, to be Added to Subtracted from Mean Time.		Diff. for 1 Hour.	Sidereal Time, or Right Ascension of Mean Sun.
		Apparent Right Ascension.	Diff. for 1 Hour.	Apparent Declination.	Diff. for 1 Hour.	m	s		
		h m s	s	° ' "	"			s	h m s
Wed.	1	16 25 50.25	10.773	S. 21 41 18.0	-24.18	11	12.62	0.917	16 37 2.87
Thur.	2	16 30 9.16	10.801	21 50 45.8	23.14	10	50.27	0.945	16 40 59.43
Fri.	3	16 34 28.72	10.828	21 59 48.5	22.09	10	27.27	0.972	16 44 55.98
Sat.	4	16 38 48.91	10.854	22 8 25.7	-21.02	10	3.63	0.998	16 48 52.54
SUN.	5	16 43 9.71	10.879	22 16 37.3	19.94	9	39.39	1.022	16 52 49.10
Mon.	6	16 47 31.10	10.902	22 24 22.9	18.85	9	14.56	1.046	16 56 45.66
Tues.	7	16 51 53.02	10.924	22 31 42.3	-17.75	8	49.20	1.068	17 0 42.22
Wed.	8	16 56 15.47	10.945	22 38 35.2	16.65	8	23.31	1.089	17 4 38.78
Thur.	9	17 0 38.40	10.965	22 45 1.4	15.54	7	56.94	1.108	17 8 35.34
Fri.	10	17 5 1.78	10.983	22 51 0.8	-14.41	7	30.12	1.126	17 12 31.89
Sat.	11	17 9 25.57	11.000	22 56 33.1	13.28	7	2.88	1.143	17 16 28.45
SUN.	12	17 13 49.75	11.015	23 1 38.2	12.14	6	35.26	1.158	17 20 25.01
Mon.	13	17 18 14.29	11.029	23 6 15.9	-11.00	6	7.28	1.172	17 24 21.57
Tues.	14	17 22 39.15	11.042	23 10 26.0	9.85	5	38.98	1.185	17 28 18.13
Wed.	15	17 27 4.30	11.053	23 14 8.6	8.69	5	10.39	1.197	17 32 14.69
Thur.	16	17 31 29.71	11.063	23 17 23.3	-7.53	4	41.53	1.207	17 36 11.25
Fri.	17	17 35 55.36	11.073	23 20 10.1	6.37	4	12.44	1.216	17 40 7.80
Sat.	18	17 40 21.21	11.081	23 22 29.0	5.20	3	43.15	1.224	17 44 4.36
SUN.	19	17 44 47.23	11.087	23 24 19.8	-4.03	3	13.69	1.231	17 48 0.92
Mon.	20	17 49 13.39	11.092	23 25 42.5	2.86	2	44.09	1.236	17 51 57.48
Tues.	21	17 53 39.67	11.096	23 26 37.0	1.68	2	14.37	1.240	17 55 54.04
Wed.	22	17 58 6.02	11.099	23 27 3.4	-0.51	1	44.58	1.243	17 59 50.60
Thur.	23	18 2 32.43	11.101	23 27 1.4	+0.67	1	14.73	1.244	18 3 47.16
Fri.	24	18 6 58.85	11.101	23 26 31.2	1.85	0	44.87	1.244	18 7 43.72
Sat.	25	18 11 25.26	11.099	23 25 32.8	+3.02	0	15.02	1.243	18 11 40.28
SUN.	26	18 15 51.62	11.097	23 24 6.1	4.20	0	14.79	1.240	18 15 36.84
Mon.	27	18 20 17.92	11.093	23 22 11.2	5.38	0	44.52	1.237	18 19 33.39
Tues.	28	18 24 44.10	11.088	23 19 48.0	+6.55	1	14.15	1.232	18 23 29.95
Wed.	29	18 29 10.15	11.082	23 16 56.8	7.72	1	43.64	1.225	18 27 26.51
Thur.	30	18 33 36.03	11.074	23 13 37.5	8.89	2	12.96	1.217	18 31 23.07
Fri.	31	18 38 1.70	11.065	23 9 50.2	10.05	2	42.07	1.208	18 35 19.63
Sat.	32	18 42 27.14	11.054	S. 23 5 35.0	+11.21	3	10.95	1.198	18 39 16.19

NOTE.—The semidiameter for mean noon may be assumed the same as that for apparent noon.
 The sign — prefixed to the hourly change of declination indicates that south declinations are increasing; the sign + indicates that south declinations are decreasing.

Diff. for 1 Hour,
 +9.8565.
 (Table III.)

AT GREENWICH MEAN NOON.

Day of the Month.	Day of the Year.	THE SUN'S				Logarithm of the Radius Vector of the Earth.	Diff. for 1 Hour.	Mean Time Sidereal No.			
		True Longitude.		Diff. for 1 Hour.	Latitude.						
		λ	λ'								
		h m	s	"	"			h m			
1	335	248	13	14.8	12	17.0	152.09	-0.50	9.993 8554	-28.0	7 21 4
2	336	249	14	5.8	13	7.9	152.15	0.56	9.993 7892	27.3	7 17 4
3	337	250	14	58.3	14	0.2	152.21	0.60	9.993 7244	26.7	7 13 5
4	338	251	15	52.0	14	53.7	152.27	-0.61	9.993 6611	-26.1	7 9 5
5	339	252	16	47.1	15	48.6	152.32	0.59	9.993 5992	25.5	7 6
6	340	253	17	43.2	16	44.5	152.36	0.53	9.993 5386	25.0	7 2
7	341	254	18	40.4	17	41.6	152.40	-0.45	9.993 4792	-24.5	6 58
8	342	255	19	38.5	18	39.5	152.44	0.34	9.993 4211	23.9	6 54 1
9	343	256	20	37.5	19	38.2	152.47	0.22	9.993 3644	23.3	6 50 1
10	344	257	21	37.2	20	37.7	152.50	-0.08	9.993 3092	-22.7	6 46 2
11	345	258	22	37.4	21	37.8	152.52	+0.06	9.993 2556	22.0	6 42 2
12	346	259	23	38.3	22	38.4	152.55	0.19	9.993 2038	21.2	6 38 2
13	347	260	24	39.6	23	39.6	152.57	+0.31	9.993 1539	-20.3	6 34 3
14	348	261	25	41.4	24	41.2	152.59	0.41	9.993 1061	19.4	6 30 3
15	349	262	26	43.7	25	43.3	152.60	0.48	9.993 0606	18.4	6 26 4
16	350	263	27	46.4	26	45.8	152.62	+0.53	9.993 0174	-17.4	6 22 4
17	351	264	28	49.6	27	48.8	152.64	0.55	9.992 9768	16.4	6 18 4
18	352	265	29	53.3	28	52.3	152.66	0.53	9.992 9386	15.3	6 14 5
19	353	266	30	57.3	29	56.2	152.68	+0.49	9.992 9031	-14.2	6 10 5
20	354	267	32	1.9	31	0.5	152.70	0.43	9.992 8703	13.1	6 7
21	355	268	33	6.9	32	5.3	152.72	0.35	9.992 8401	12.0	6 3
22	356	269	34	12.4	33	10.6	152.74	+0.25	9.992 8128	-10.8	5 59 1
23	357	270	35	18.4	34	16.4	152.76	+0.13	9.992 7882	9.7	5 55 1
24	358	271	36	24.8	35	22.6	152.78	0.00	9.992 7662	8.6	5 51 1
25	359	272	37	31.8	36	29.5	152.80	-0.13	9.992 7469	-7.5	5 47 2
26	360	273	38	39.4	37	36.8	152.83	0.25	9.992 7303	6.4	5 43 2
27	361	274	39	47.4	38	44.6	152.85	0.36	9.992 7164	5.3	5 39 3
28	362	275	40	56.0	39	53.0	152.87	-0.46	9.992 7048	-4.3	5 35 3
29	363	276	42	5.0	41	1.9	152.89	0.53	9.992 6957	3.3	5 31 3
30	364	277	43	14.6	42	11.3	152.91	0.58	9.992 6888	2.4	5 27 4
31	365	278	44	24.6	43	21.1	152.93	0.60	9.992 6840	1.6	5 23 4
32	366	279	45	35.0	44	31.3	152.94	-0.58	9.992 6812	-0.8	5 19 5

NOTE.—The longitudes in the column λ are referred to the true equinox of their own date, while those in the column λ' are referred to the mean equinox of the beginning of the Besselian fictitious year.

Diff. for 1
— $g^{\circ}.829$
(Table 1)

GREENWICH MEAN TIME.

Day of the Month.	THE MOON'S								
	SEMIDIAMETER.		HORIZONTAL PARALLAX.				UPPER TRANSIT.		AGE.
	Noon.	Midnight.	Noon.	Diff. for 1 Hour.	Midnight.	Diff. for 1 Hour.	Meridian of Greenwich.	Diff. for 1 Hour.	Noon.
	' "	' "	' "	"	' "	"	h m	m	d
1	15 43.5	15 51.4	57 36.77	+2.383	58 5.73	+2.437	19 43.2	1.98	24.2
2	15 59.4	16 7.3	58 35.08	2.446	59 4.23	2.402	20 32.5	2.15	25.2
3	16 15.0	16 22.3	59 32.49	2.298	59 59.14	2.134	21 26.6	2.37	26.2
4	16 28.9	16 34.7	60 23.45	+1.907	60 44.67	+1.619	22 26.3	2.60	27.2
5	16 39.4	16 43.0	61 2.10	1.277	61 15.16	0.893	23 31.1	2.77	28.2
6	16 45.2	16 46.1	61 23.41	+0.478	61 26.56	+0.045	6	.	29.2
7	16 45.5	16 43.6	61 24.48	-0.389	61 17.29	-0.804	0 38.6	2.81	0.7
8	16 40.3	16 35.9	61 5.32	1.185	60 49.03	1.521	1 45.0	2.70	1.7
9	16 30.4	16 24.1	60 29.02	1.805	60 5.95	2.030	2 47.3	2.48	2.7
10	16 17.2	16 9.9	59 40.55	-2.193	59 13.56	-2.296	3 43.9	2.24	3.7
11	16 2.3	15 54.6	58 45.66	2.345	58 17.49	2.343	4 35.1	2.04	4.7
12	15 47.0	15 39.6	57 49.61	2.298	57 22.49	2.217	5 22.1	1.90	5.7
13	15 32.5	15 25.8	56 56.51	-2.108	56 31.98	-1.978	6 6.5	1.81	6.7
14	15 19.6	15 13.9	56 9.11	1.832	55 48.05	1.676	6 49.6	1.78	7.7
15	15 8.6	15 4.0	55 28.91	1.514	55 11.73	1.350	7 32.6	1.81	8.7
16	14 59.8	14 56.2	54 56.50	-1.189	54 43.17	-1.033	8 16.6	1.86	9.7
17	14 53.0	14 50.4	54 31.69	0.881	54 22.00	0.734	9 2.2	1.95	10.7
18	14 48.2	14 46.5	54 14.03	0.596	54 7.66	0.467	9 50.0	2.03	11.7
19	14 45.2	14 44.2	54 2.79	-0.345	53 59.37	-0.227	10 39.6	2.09	12.7
20	14 43.7	14 43.5	53 57.33	-0.114	53 56.61	-0.007	11 30.3	2.12	13.7
21	14 43.6	14 44.1	53 57.15	+0.097	53 58.94	+0.202	12 21.0	2.10	14.7
22	14 45.0	14 46.1	54 2.00	+0.308	54 6.34	+0.415	13 10.6	2.03	15.7
23	14 47.7	14 49.6	54 11.97	0.524	54 18.94	0.639	13 58.4	1.95	16.7
24	14 51.9	14 54.6	54 27.32	0.759	54 37.18	0.886	14 44.1	1.86	17.7
25	14 57.7	15 1.2	54 48.60	+1.018	55 1.64	+1.156	15 27.9	1.80	18.7
26	15 5.2	15 9.7	55 16.36	1.298	55 32.79	1.441	16 10.6	1.77	19.7
27	15 14.6	15 20.1	55 50.95	1.585	56 10.83	1.727	16 53.1	1.79	20.7
28	15 25.9	15 32.2	56 32.38	+1.862	56 55.48	+1.985	17 36.7	1.86	21.7
29	15 38.9	15 45.9	57 19.95	2.090	57 45.54	2.171	18 22.6	1.99	22.7
30	15 53.1	16 0.4	58 11.93	2.222	58 38.72	2.236	19 12.4	2.18	23.7
31	16 7.6	16 14.7	59 5.43	2.206	59 31.47	2.125	20 7.3	2.40	24.7
32	16 21.5	16 27.7	59 56.21	+1.989	60 18.98	+1.795	21 7.7	2.63	25.7

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.
WEDNESDAY 1.					FRIDAY 3.			
	h m s	s	° ' "	"		h m s	s	° ' "
0	11 43 30.40	1.9873	S. 2 16 0.1	15.120	0	13 24 40.00	2.2623	S. 14 11 5.0
1	11 45 29.74	1.9908	2 31 7.6	15.131	1	13 26 55.97	2.2701	14 25 9.3
2	11 47 29.30	1.9945	2 46 15.8	15.141	2	13 29 12.41	2.2780	14 39 9.8
3	11 49 29.08	1.9983	3 1 24.5	15.149	3	13 31 29.33	2.2860	14 53 6.4
4	11 51 29.09	2.0021	3 16 33.7	15.157	4	13 33 46.73	2.2940	15 6 59.0
5	11 53 29.33	2.0061	3 31 43.3	15.163	5	13 36 4.61	2.3021	15 20 47.5
6	11 55 29.82	2.0102	3 46 53.3	15.168	6	13 38 22.98	2.3103	15 34 31.8
7	11 57 30.55	2.0143	4 2 3.5	15.172	7	13 40 41.84	2.3185	15 48 11.7
8	11 59 31.53	2.0184	4 17 13.9	15.174	8	13 43 1.20	2.3268	16 1 47.1
9	12 1 32.76	2.0228	4 32 24.4	15.175	9	13 45 21.05	2.3350	16 15 17.9
10	12 3 34.26	2.0273	4 47 34.9	15.175	10	13 47 41.40	2.3434	16 28 44.0
11	12 5 36.03	2.0318	5 2 45.4	15.175	11	13 50 2.26	2.3519	16 42 5.2
12	12 7 38.07	2.0363	5 17 55.9	15.173	12	13 52 23.63	2.3603	16 55 21.5
13	12 9 40.39	2.0410	5 33 6.2	15.169	13	13 54 45.50	2.3688	17 8 32.7
14	12 11 42.99	2.0458	5 48 16.2	15.164	14	13 57 7.89	2.3775	17 21 38.6
15	12 13 45.88	2.0507	6 3 25.9	15.158	15	13 59 30.80	2.3861	17 34 39.2
16	12 15 49.07	2.0557	6 18 35.1	15.150	16	14 1 54.22	2.3948	17 47 34.2
17	12 17 52.56	2.0608	6 33 43.9	15.142	17	14 4 18.17	2.4035	18 0 23.6
18	12 19 56.36	2.0659	6 48 52.1	15.131	18	14 6 42.64	2.4122	18 13 7.2
19	12 22 0.47	2.0711	7 3 59.6	15.119	19	14 9 7.63	2.4209	18 25 45.0
20	12 24 4.89	2.0764	7 19 6.4	15.107	20	14 11 33.15	2.4298	18 38 16.7
21	12 26 9.64	2.0819	7 34 12.4	15.093	21	14 13 59.20	2.4385	18 50 42.3
22	12 28 14.72	2.0874	7 49 17.5	15.077	22	14 16 25.77	2.4473	19 3 1.6
23	12 30 20.13	2.0931	S. 8 4 21.6	15.059	23	14 18 52.88	2.4563	S. 19 15 14.4
THURSDAY 2.					SATURDAY 4.			
0	12 32 25.89	2.0988	S. 8 19 24.6	15.040	0	14 21 20.52	2.4651	S. 19 27 20.6
1	12 34 31.99	2.1046	8 34 26.4	15.020	1	14 23 48.69	2.4739	19 39 20.2
2	12 36 38.44	2.1105	8 49 27.0	14.998	2	14 26 17.39	2.4828	19 51 12.5
3	12 38 45.25	2.1165	9 4 26.2	14.975	3	14 28 46.63	2.4918	20 2 58.7
4	12 40 52.42	2.1226	9 19 24.0	14.951	4	14 31 16.40	2.5006	20 14 37.3
5	12 42 59.06	2.1288	9 34 20.3	14.924	5	14 33 46.70	2.5095	20 26 8.7
6	12 45 7.87	2.1350	9 49 14.9	14.895	6	14 36 17.54	2.5184	20 37 32.7
7	12 47 16.16	2.1414	10 4 7.7	14.866	7	14 38 48.91	2.5273	20 48 49.1
8	12 49 24.84	2.1478	10 18 58.8	14.836	8	14 41 20.81	2.5361	20 59 57.9
9	12 51 33.90	2.1543	10 33 48.0	14.803	9	14 43 53.24	2.5448	21 10 58.9
10	12 53 43.35	2.1609	10 48 35.1	14.768	10	14 46 26.19	2.5537	21 21 51.9
11	12 55 53.21	2.1677	11 3 20.1	14.732	11	14 48 59.68	2.5625	21 32 36.8
12	12 58 3.47	2.1744	11 18 2.9	14.694	12	14 51 33.69	2.5713	21 43 13.6
13	13 0 14.14	2.1813	11 32 43.4	14.654	13	14 54 8.23	2.5799	21 53 42.1
14	13 2 25.22	2.1883	11 47 21.4	14.613	14	14 56 43.28	2.5886	22 4 2.0
15	13 4 36.73	2.1953	12 1 56.9	14.570	15	14 59 18.86	2.5973	22 14 13.3
16	13 6 48.66	2.2024	12 16 29.8	14.525	16	15 1 54.95	2.6058	22 24 15.9
17	13 9 1.02	2.2097	12 30 59.9	14.478	17	15 4 31.55	2.6143	22 34 9.5
18	13 11 13.82	2.2169	12 45 27.2	14.430	18	15 7 8.66	2.6227	22 43 54.1
19	13 13 27.05	2.2243	12 59 51.5	14.380	19	15 9 46.27	2.6310	22 53 29.6
20	13 15 40.73	2.2318	13 14 12.8	14.328	20	15 12 24.38	2.6393	23 2 55.8
21	13 17 54.86	2.2393	13 28 30.9	14.274	21	15 15 2.99	2.6476	23 12 12.5
22	13 20 9.45	2.2469	13 42 45.7	14.218	22	15 17 42.09	2.6558	23 21 19.7
23	13 22 24.49	2.2546	13 56 57.1	14.161	23	15 20 21.68	2.6638	23 30 17.2
24	13 24 40.00	2.2623	S. 14 11 5.0	14.102	24	15 23 1.74	2.6717	S. 23 39 4.9

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
SUNDAY 5.					TUESDAY 7.				
0	h m s	s	" ' "	"	0	h m s	s	" ' "	"
0	15 23 1.74	2.6717	S. 23 39 4.9	8.713	0	17 37 33.25	2.8563	S. 26 55 48.3	0.932
1	15 25 42.28	2.6797	23 47 42.7	8.546	1	17 40 24.58	2.8547	26 54 45.9	1.148
2	15 28 23.30	2.6875	23 56 10.4	8.377	2	17 43 15.81	2.8528	26 53 30.6	1.363
3	15 31 4.78	2.6951	24 4 27.9	8.206	3	17 46 6.92	2.8508	26 52 2.4	1.578
4	15 33 46.71	2.7026	24 12 35.1	8.033	4	17 48 57.90	2.8485	26 50 21.3	1.792
5	15 36 29.09	2.7100	24 20 31.9	7.858	5	17 51 48.74	2.8460	26 48 27.4	2.005
6	15 39 11.91	2.7173	24 28 18.1	7.682	6	17 54 39.42	2.8432	26 46 20.7	2.218
7	15 41 55.17	2.7246	24 35 53.7	7.503	7	17 57 29.92	2.8402	26 44 1.3	2.429
8	15 44 38.86	2.7316	24 43 18.5	7.323	8	18 0 20.24	2.8370	26 41 29.2	2.641
9	15 47 22.96	2.7384	24 50 32.4	7.140	9	18 3 10.36	2.8335	26 38 44.4	2.851
10	15 50 7.47	2.7453	24 57 35.3	6.956	10	18 6 0.26	2.8298	26 35 47.1	3.060
11	15 52 55.39	2.7519	25 4 27.1	6.770	11	18 8 49.94	2.8261	26 32 37.2	3.268
12	15 55 37.70	2.7583	25 11 7.7	6.582	12	18 11 39.39	2.8220	26 29 14.9	3.476
13	15 58 23.39	2.7647	25 17 36.9	6.392	13	18 14 28.58	2.8176	26 25 40.1	3.683
14	16 1 9.46	2.7708	25 23 54.7	6.201	14	18 17 17.50	2.8131	26 21 53.0	3.887
15	16 3 55.89	2.7768	25 30 1.0	6.008	15	18 20 6.15	2.8084	26 17 53.7	4.091
16	16 6 42.67	2.7825	25 35 55.7	5.813	16	18 22 54.51	2.8035	26 13 42.1	4.294
17	16 9 29.79	2.7882	25 41 38.6	5.617	17	18 25 42.57	2.7983	26 9 18.4	4.495
18	16 12 17.25	2.7937	25 47 9.7	5.419	18	18 28 30.31	2.7930	26 4 42.7	4.694
19	16 15 5.03	2.7988	25 52 28.9	5.220	19	18 31 17.73	2.7876	25 59 55.1	4.893
20	16 17 53.11	2.8039	25 57 36.1	5.020	20	18 34 4.82	2.7820	25 54 55.6	5.090
21	16 20 41.50	2.8088	26 2 31.3	4.819	21	18 36 51.57	2.7762	25 49 44.3	5.286
22	16 23 30.17	2.8135	26 7 14.4	4.616	22	18 39 37.96	2.7701	25 44 21.3	5.480
23	16 26 19.12	2.8180	S. 26 11 45.2	4.411	23	18 42 23.98	2.7639	S. 25 38 46.7	5.673
MONDAY 6.					WEDNESDAY 8.				
0	h m s	s	" ' "	"	0	h m s	s	" ' "	"
0	16 29 8.33	2.8223	S. 26 16 3.7	4.205	0	18 45 9.63	2.7576	S. 25 33 0.6	5.863
1	16 31 57.79	2.8263	26 20 9.8	3.998	1	18 47 54.89	2.7510	25 27 3.2	6.052
2	16 34 47.49	2.8303	26 24 3.5	3.790	2	18 50 39.75	2.7443	25 20 54.4	6.240
3	16 37 37.42	2.8339	26 27 44.6	3.581	3	18 53 24.20	2.7374	25 14 34.4	6.425
4	16 40 27.56	2.8373	26 31 13.2	3.372	4	18 56 8.24	2.7305	25 8 3.4	6.608
5	16 43 17.89	2.8403	26 34 29.2	3.161	5	18 58 51.86	2.7234	25 1 21.4	6.790
6	16 46 8.40	2.8433	26 37 32.5	2.949	6	19 1 35.05	2.7162	24 54 28.6	6.970
7	16 48 59.09	2.8461	26 40 23.1	2.738	7	19 4 17.80	2.7088	24 47 25.0	7.148
8	16 51 49.93	2.8486	26 43 1.0	2.524	8	19 7 0.11	2.7013	24 40 10.8	7.325
9	16 54 40.92	2.8509	26 45 26.0	2.310	9	19 9 41.96	2.6937	24 32 46.0	7.500
10	16 57 32.04	2.8529	26 47 38.2	2.097	10	19 12 23.35	2.6860	24 25 10.8	7.673
11	17 0 23.27	2.8548	26 49 37.6	1.882	11	19 15 4.28	2.6782	24 17 25.3	7.843
12	17 3 14.61	2.8563	26 51 24.0	1.666	12	19 17 44.73	2.6702	24 9 29.7	8.011
13	17 6 6.03	2.8576	26 52 57.5	1.450	13	19 20 24.70	2.6622	24 1 24.0	8.178
14	17 8 57.52	2.8586	26 54 18.0	1.233	14	19 23 4.19	2.6540	23 53 8.4	8.341
15	17 11 49.06	2.8594	26 55 25.5	1.018	15	19 25 43.18	2.6458	23 44 43.1	8.503
16	17 14 40.65	2.8601	26 56 20.1	0.802	16	19 28 21.68	2.6375	23 36 8.1	8.665
17	17 17 32.27	2.8605	26 57 1.7	0.584	17	19 30 59.68	2.6292	23 27 23.5	8.822
18	17 20 23.91	2.8607	26 57 30.2	0.367	18	19 33 37.18	2.6208	23 18 29.5	8.978
19	17 23 15.55	2.8605	26 57 45.7	-0.150	19	19 36 14.17	2.6122	23 9 26.2	9.131
20	17 26 7.17	2.8602	26 57 48.2	-0.067	20	19 38 50.64	2.6036	23 0 13.8	9.283
21	17 28 58.77	2.8597	26 57 37.7	0.283	21	19 41 26.60	2.5950	22 50 52.3	9.433
22	17 31 50.33	2.8588	26 57 14.2	0.500	22	19 44 2.04	2.5863	22 41 21.9	9.579
23	17 34 41.83	2.8577	26 56 37.7	0.716	23	19 46 36.95	2.5774	22 31 42.8	9.724
24	17 37 33.25	2.8563	S. 26 55 48.3	0.932	24	19 49 11.33	2.5687	S. 22 21 55.0	9.868

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
THURSDAY 9.					SATURDAY 11.				
0	h m s	s	° ' "	"	0	h m s	s	° ' "	"
0	19 49 11.33	2.5687	S. 22 21 55.0	9.868	0	21 42 26.33	2.1662	S. 12 24 50.1	14.228
1	19 51 45.19	2.5598	22 11 58.7	10.008	1	21 44 36.09	2.1593	12 10 35.1	14.273
2	19 54 18.51	2.5509	22 1 54.1	10.146	2	21 46 45.44	2.1524	11 56 17.4	14.316
3	19 56 51.30	2.5421	21 51 41.2	10.283	3	21 48 54.38	2.1457	11 41 57.2	14.356
4	19 59 23.56	2.5332	21 41 20.2	10.416	4	21 51 2.92	2.1390	11 27 34.7	14.395
5	20 1 55.28	2.5242	21 30 51.3	10.548	5	21 53 11.06	2.1324	11 13 9.8	14.433
6	20 4 26.46	2.5153	21 20 14.5	10.678	6	21 55 18.81	2.1260	10 58 42.7	14.469
7	20 6 57.11	2.5063	21 9 30.0	10.805	7	21 57 26.18	2.1196	10 44 13.5	14.503
8	20 9 27.22	2.4973	20 58 37.9	10.931	8	21 59 33.16	2.1133	10 29 42.3	14.536
9	20 11 56.78	2.4883	20 47 38.3	11.053	9	22 1 39.77	2.1071	10 15 9.2	14.568
10	20 14 25.81	2.4793	20 36 31.5	11.173	10	22 3 46.01	2.1009	10 0 34.2	14.598
11	20 16 54.30	2.4703	20 25 17.5	11.293	11	22 5 51.88	2.0949	9 45 57.4	14.627
12	20 19 22.24	2.4612	20 13 56.4	11.409	12	22 7 57.40	2.0890	9 31 19.0	14.653
13	20 21 49.64	2.4523	20 2 28.4	11.523	13	22 10 2.56	2.0831	9 16 39.0	14.679
14	20 24 16.51	2.4433	19 50 53.7	11.634	14	22 12 7.37	2.0773	9 1 57.5	14.703
15	20 26 42.84	2.4343	19 39 12.3	11.745	15	22 14 11.84	2.0718	8 47 14.6	14.726
16	20 29 8.63	2.4254	19 27 24.3	11.853	16	22 16 15.98	2.0662	8 32 30.4	14.748
17	20 31 33.89	2.4166	19 15 30.0	11.957	17	22 18 19.78	2.0607	8 17 44.9	14.768
18	20 33 58.62	2.4078	19 3 29.5	12.060	18	22 20 23.26	2.0553	8 2 58.3	14.786
19	20 36 22.82	2.3988	18 51 22.8	12.162	19	22 22 26.42	2.0501	7 48 10.6	14.804
20	20 38 46.48	2.3900	18 39 10.1	12.261	20	22 24 29.27	2.0449	7 33 21.8	14.821
21	20 41 9.62	2.3813	18 26 51.5	12.358	21	22 26 31.81	2.0398	7 18 32.1	14.835
22	20 43 32.23	2.3725	18 14 27.2	12.453	22	22 28 34.04	2.0348	7 3 41.6	14.848
23	20 45 54.32	2.3638	S. 18 1 57.2	12.546	23	22 30 35.98	2.0298	S. 6 48 50.3	14.861
FRIDAY 10.					SUNDAY 12.				
0	h m s	s	° ' "	"	0	h m s	s	° ' "	"
0	20 48 15.88	2.3551	S. 17 49 21.7	12.636	0	22 32 37.62	2.0250	S. 6 33 58.3	14.872
1	20 50 36.93	2.3465	17 36 40.9	12.724	1	22 34 38.98	2.0203	6 19 5.7	14.882
2	20 52 57.46	2.3379	17 23 54.8	12.811	2	22 36 40.06	2.0157	6 4 12.5	14.891
3	20 55 17.48	2.3294	17 11 3.6	12.895	3	22 38 40.86	2.0112	5 49 18.8	14.898
4	20 57 36.99	2.3210	16 58 7.4	12.978	4	22 40 41.40	2.0068	5 34 24.8	14.903
5	20 59 56.00	2.3127	16 45 6.3	13.058	5	22 42 41.67	2.0023	5 19 30.4	14.909
6	21 2 14.51	2.3043	16 32 0.4	13.137	6	22 44 41.68	1.9981	5 4 35.7	14.913
7	21 4 32.52	2.2960	16 18 49.9	13.213	7	22 46 41.44	1.9939	4 49 40.9	14.915
8	21 6 50.03	2.2878	16 5 34.8	13.288	8	22 48 40.95	1.9898	4 34 45.9	14.917
9	21 9 7.05	2.2796	15 52 15.4	13.360	9	22 50 40.22	1.9859	4 19 50.9	14.917
10	21 11 23.58	2.2715	15 38 51.6	13.431	10	22 52 39.26	1.9821	4 4 55.9	14.916
11	21 13 39.63	2.2635	15 25 23.7	13.499	11	22 54 38.07	1.9783	3 50 1.0	14.914
12	21 15 55.20	2.2556	15 11 51.7	13.567	12	22 56 36.65	1.9745	3 35 6.2	14.911
13	21 18 10.30	2.2478	14 58 15.7	13.632	13	22 58 35.01	1.9709	3 20 11.7	14.907
14	21 20 24.93	2.2399	14 44 35.9	13.694	14	23 0 33.16	1.9675	3 5 17.4	14.903
15	21 22 39.09	2.2322	14 30 52.4	13.755	15	23 2 31.11	1.9640	2 50 23.4	14.896
16	21 24 52.79	2.2245	14 17 5.3	13.815	16	23 4 28.84	1.9606	2 35 29.9	14.888
17	21 27 6.03	2.2169	14 3 14.6	13.873	17	23 6 26.38	1.9574	2 20 36.8	14.881
18	21 29 18.82	2.2094	13 49 20.5	13.929	18	23 8 23.73	1.9543	2 5 44.2	14.872
19	21 31 31.16	2.2020	13 35 23.1	13.983	19	23 10 20.89	1.9512	1 50 52.2	14.861
20	21 33 43.06	2.1947	13 21 22.5	14.036	20	23 12 17.87	1.9483	1 36 0.9	14.849
21	21 35 54.52	2.1874	13 7 18.8	14.087	21	23 14 14.68	1.9454	1 21 10.3	14.838
22	21 38 5.55	2.1803	12 53 12.1	14.136	22	23 16 11.32	1.9426	1 6 20.4	14.824
23	21 40 16.15	2.1732	12 39 2.5	14.183	23	23 18 7.79	1.9399	0 51 31.4	14.810
24	21 42 26.33	2.1662	S. 12 24 50.1	14.228	24	23 20 4.11	1.9373	S. 0 36 43.2	14.795

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
MONDAY 13.					WEDNESDAY 15.				
0	h m s	s	° ' "	"	0	h m s	s	N. ° ' "	"
1	23 20 4.11	1.9373	S. 0 36 43.2	14.795	1	0 51 37.79	1.9074	N. 10 39 30.4	13.073
2	23 22 0.27	1.9348	0 21 56.0	14.778	2	0 53 32.27	1.9086	10 52 33.2	13.018
3	23 23 56.28	1.9323	S. 0 7 9.8	14.762	3	0 55 26.82	1.9098	11 5 32.6	12.963
4	23 25 52.15	1.9300	N. 0 7 35.4	14.743	4	0 57 21.44	1.9110	11 18 28.7	12.907
5	23 27 47.88	1.9278	0 22 19.4	14.724	5	0 59 16.14	1.9124	11 31 21.4	12.849
6	23 29 43.48	1.9255	0 37 2.3	14.705	6	1 1 10.93	1.9138	11 44 10.6	12.791
7	23 31 38.94	1.9233	0 51 44.0	14.684	7	1 3 5.80	1.9153	11 56 56.3	12.733
8	23 33 34.28	1.9214	1 6 24.4	14.663	8	1 5 0.76	1.9168	12 9 38.5	12.674
9	23 35 29.51	1.9196	1 21 3.5	14.640	9	1 6 55.82	1.9184	12 22 17.2	12.614
10	23 37 24.63	1.9178	1 35 41.2	14.617	10	1 8 50.97	1.9200	12 34 52.2	12.553
11	23 39 19.64	1.9159	1 50 17.5	14.593	11	1 10 46.22	1.9218	12 47 23.6	12.492
12	23 41 14.54	1.9143	2 4 52.3	14.568	12	1 12 41.58	1.9235	12 59 51.2	12.429
13	23 43 9.35	1.9128	2 19 25.6	14.542	13	1 14 37.04	1.9253	13 12 15.1	12.367
14	23 45 4.07	1.9113	2 33 57.3	14.514	14	1 16 32.61	1.9272	13 24 35.2	12.303
15	23 46 58.70	1.9098	2 48 27.3	14.487	15	1 18 28.30	1.9291	13 36 51.5	12.239
16	23 48 53.25	1.9085	3 2 55.7	14.458	16	1 20 24.10	1.9310	13 49 3.9	12.173
17	23 50 47.72	1.9072	3 17 22.3	14.428	17	1 22 20.02	1.9330	14 1 12.3	12.108
18	23 52 42.11	1.9060	3 31 47.1	14.398	18	1 24 16.06	1.9351	14 13 16.8	12.042
19	23 54 36.44	1.9050	3 46 10.1	14.368	19	1 26 12.23	1.9372	14 25 17.3	11.974
20	23 56 30.71	1.9040	4 0 31.2	14.336	20	1 28 8.52	1.9393	14 37 13.7	11.906
21	23 58 24.92	1.9031	4 14 50.4	14.303	21	1 30 4.95	1.9416	14 49 6.0	11.838
22	0 0 19.08	1.9022	4 29 7.6	14.270	22	1 32 1.51	1.9438	15 0 54.2	11.768
23	0 2 13.18	1.9013	4 43 22.8	14.236	23	1 33 58.21	1.9462	15 12 38.1	11.697
24	0 4 7.24	1.9008	N. 4 57 35.9	14.201	24	1 35 55.05	1.9485	N. 15 24 17.8	11.627
TUESDAY 14.					THURSDAY 16.				
0	0 6 1.27	1.9002	N. 5 11 46.9	14.165	0	1 37 52.03	1.9509	N. 15 35 53.3	11.555
1	0 7 55.26	1.8996	5 25 55.7	14.128	1	1 39 49.16	1.9533	15 47 24.4	11.483
2	0 9 49.22	1.8992	5 40 2.2	14.090	2	1 41 46.43	1.9558	15 58 51.2	11.409
3	0 11 43.16	1.8988	5 54 6.5	14.053	3	1 43 43.86	1.9584	16 10 13.5	11.335
4	0 13 37.07	1.8984	6 8 8.5	14.013	4	1 45 41.44	1.9610	16 21 31.4	11.261
5	0 15 30.97	1.8983	6 22 8.1	13.973	5	1 47 39.18	1.9636	16 32 44.8	11.186
6	0 17 24.86	1.8981	6 36 5.3	13.933	6	1 49 37.07	1.9662	16 43 53.7	11.109
7	0 19 18.74	1.8979	6 50 0.1	13.892	7	1 51 35.12	1.9689	16 54 57.9	11.032
8	0 21 12.61	1.8979	7 3 52.3	13.849	8	1 53 33.34	1.9717	17 5 57.5	10.955
9	0 23 6.49	1.8981	7 17 42.0	13.807	9	1 55 31.72	1.9744	17 16 52.5	10.877
10	0 25 0.38	1.8983	7 31 29.1	13.763	10	1 57 30.27	1.9772	17 27 42.7	10.798
11	0 26 54.28	1.8984	7 45 13.6	13.718	11	1 59 28.98	1.9800	17 38 28.2	10.718
12	0 28 48.19	1.8987	7 58 55.3	13.673	12	2 1 27.87	1.9829	17 49 8.8	10.637
13	0 30 42.12	1.8990	8 12 34.3	13.628	13	2 3 26.93	1.9858	17 59 44.6	10.556
14	0 32 36.07	1.8994	8 26 10.6	13.581	14	2 5 26.16	1.9887	18 10 15.5	10.473
15	0 34 30.05	1.8999	8 39 44.0	13.533	15	2 7 25.57	1.9917	18 20 41.4	10.391
16	0 36 24.06	1.9005	8 53 14.6	13.485	16	2 9 25.16	1.9947	18 31 2.4	10.308
17	0 38 18.11	1.9012	9 6 42.2	13.436	17	2 11 24.93	1.9977	18 41 18.3	10.223
18	0 40 12.20	1.9018	9 20 6.9	13.387	18	2 13 24.88	2.0007	18 51 29.2	10.138
19	0 42 6.33	1.9026	9 33 28.6	13.336	19	2 15 25.01	2.0038	19 1 34.9	10.053
20	0 44 0.51	1.9034	9 46 47.2	13.285	20	2 17 25.33	2.0069	19 11 35.5	9.966
21	0 45 54.74	1.9043	10 0 2.8	13.233	21	2 19 25.84	2.0100	19 21 30.8	9.878
22	0 47 49.03	1.9053	10 13 15.2	13.180	22	2 21 26.53	2.0131	19 31 20.9	9.791
23	0 49 43.38	1.9063	10 26 24.4	13.127	23	2 23 27.41	2.0163	19 41 5.7	9.703
24	0 51 37.79	1.9074	N. 10 39 30.4	13.073	24	2 25 28.48	2.0194	N. 19 50 45.2	9.613

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.
FRIDAY 17.					SUNDAY 19.			
0	h m s	s	° ' "	"	0	h m s	s	° ' "
1	2 25 28.48	2.0194	N. 19 50 45.2	9.613	1	4 6 5.71	2.1669	N. 25 35 48.9
2	2 27 29.74	2.0226	20 0 19.3	9.523	2	4 8 15.80	2.1693	25 40 16.1
3	2 29 31.19	2.0258	20 9 48.0	9.433	3	4 10 26.03	2.1717	25 44 36.0
4	2 31 32.84	2.0291	20 19 11.2	9.340	4	4 12 36.40	2.1739	25 48 48.6
5	2 33 34.68	2.0323	20 28 28.8	9.248	5	4 14 46.90	2.1761	25 52 53.9
6	2 35 36.72	2.0356	20 37 40.9	9.155	6	4 16 57.53	2.1783	25 56 51.8
7	2 37 38.95	2.0388	20 46 47.4	9.062	7	4 19 8.30	2.1805	26 0 42.4
8	2 39 41.38	2.0421	20 55 48.3	8.968	8	4 21 19.19	2.1825	26 4 25.6
9	2 41 44.00	2.0453	21 4 43.5	8.872	9	4 23 30.20	2.1845	26 8 1.3
10	2 43 46.82	2.0487	21 13 32.9	8.775	10	4 25 41.33	2.1864	26 11 29.6
11	2 45 49.84	2.0520	21 22 16.5	8.678	11	4 27 52.57	2.1883	26 14 50.4
12	2 47 53.06	2.0553	21 30 54.3	8.582	12	4 30 3.93	2.1902	26 18 3.7
13	2 49 56.47	2.0585	21 39 26.3	8.483	13	4 32 15.39	2.1919	26 21 9.5
14	2 51 0.08	2.0618	21 47 52.3	8.384	14	4 34 26.96	2.1936	26 24 7.8
15	2 52 3.89	2.0652	21 56 12.4	8.285	15	4 36 38.62	2.1952	26 26 58.5
16	2 53 7.90	2.0684	22 4 26.5	8.185	16	4 38 50.38	2.1968	26 29 41.6
17	2 54 12.10	2.0717	22 12 34.6	8.084	17	4 41 2.24	2.1983	26 32 17.1
18	3 0 16.50	2.0750	22 20 36.6	7.983	18	4 43 14.18	2.1997	26 34 45.0
19	3 2 21.10	2.0783	22 28 32.5	7.880	19	4 45 26.20	2.2011	26 37 5.3
20	3 4 25.90	2.0816	22 36 22.2	7.777	20	4 47 38.31	2.2024	26 39 17.9
21	3 6 30.89	2.0848	22 44 5.7	7.673	21	4 49 50.49	2.2036	26 41 22.8
22	3 8 36.08	2.0881	22 51 43.0	7.569	22	4 52 2.74	2.2047	26 43 20.1
23	3 10 41.46	2.0913	22 59 14.0	7.464	23	4 54 15.05	2.2058	26 45 9.7
24	3 12 47.04	2.0946	N. 23 6 38.7	7.358	24	4 56 27.43	2.2068	N. 26 46 51.6
SATURDAY 18.					MONDAY 20.			
0	3 14 52.81	2.0978	N. 23 13 57.0	7.252	0	4 58 39.87	2.2078	N. 26 48 25.8
1	3 16 58.77	2.1010	23 21 8.9	7.145	1	5 0 52.37	2.2087	26 49 52.2
2	3 19 4.93	2.1043	23 28 14.4	7.038	2	5 3 4.91	2.2094	26 51 10.9
3	3 21 11.28	2.1073	23 35 13.4	6.928	3	5 5 17.50	2.2102	26 52 21.9
4	3 23 17.81	2.1105	23 42 5.8	6.819	4	5 7 30.13	2.2108	26 53 25.1
5	3 25 24.54	2.1137	23 48 51.7	6.710	5	5 9 42.79	2.2113	26 54 20.5
6	3 27 31.45	2.1167	23 55 31.0	6.600	6	5 11 55.49	2.2119	26 55 8.2
7	3 29 38.54	2.1198	24 2 3.7	6.489	7	5 14 8.22	2.2123	26 55 48.1
8	3 31 45.82	2.1228	24 8 29.7	6.378	8	5 16 20.97	2.2126	26 56 20.2
9	3 33 53.28	2.1258	24 14 49.0	6.265	9	5 18 33.73	2.2128	26 56 44.6
10	3 36 0.92	2.1288	24 21 1.5	6.153	10	5 20 46.51	2.2131	26 57 1.1
11	3 38 8.74	2.1318	24 27 7.3	6.039	11	5 22 59.30	2.2132	26 57 9.9
12	3 40 16.74	2.1348	24 33 6.2	5.925	12	5 25 12.09	2.2132	26 57 10.9
13	3 42 24.91	2.1377	24 38 58.3	5.810	13	5 27 24.88	2.2132	26 57 4.0
14	3 44 33.26	2.1406	24 44 43.4	5.695	14	5 29 37.67	2.2131	26 56 49.4
15	3 46 41.78	2.1433	24 50 21.7	5.580	15	5 31 50.45	2.2128	26 56 27.0
16	3 48 50.46	2.1461	24 55 53.0	5.463	16	5 34 3.21	2.2126	26 55 56.8
17	3 50 59.31	2.1488	25 1 17.3	5.347	17	5 36 15.96	2.2123	26 55 18.8
18	3 53 8.32	2.1516	25 6 34.6	5.230	18	5 38 28.68	2.2118	26 54 33.0
19	3 55 17.50	2.1543	25 11 44.9	5.112	19	5 40 41.38	2.2114	26 53 39.5
20	3 57 26.84	2.1569	25 16 48.0	4.993	20	5 42 54.05	2.2108	26 52 38.2
21	3 59 36.33	2.1594	25 21 44.0	4.873	21	5 45 6.68	2.2102	26 51 29.1
22	4 1 45.97	2.1620	25 26 32.8	4.754	22	5 47 19.27	2.2094	26 50 12.3
23	4 3 55.77	2.1645	25 31 14.5	4.634	23	5 49 31.81	2.2086	26 48 47.8
24	4 6 5.71	2.1669	N. 25 35 48.9	4.513	24	5 51 44.30	2.2078	N. 26 47 15.5

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
TUESDAY 21.					THURSDAY 23.			
h m s	s	° ' "	"		h m s	s	° ' "	"
5 51 44.30	2.2078	N. 26 47 15.5	1.603	0	7 35 30.09	2.0963	N. 23 8 14.3	7.339
5 53 56.74	2.2068	26 45 35.5	1.732	1	7 37 35.77	2.0931	23 0 50.8	7.444
5 56 9.12	2.2058	26 43 47.7	1.860	2	7 39 41.26	2.0898	22 53 21.0	7.549
5 58 21.44	2.2048	26 41 52.3	1.988	3	7 41 46.54	2.0864	22 45 44.9	7.654
6 0 33.69	2.2036	26 39 49.2	2.116	4	7 43 51.63	2.0831	22 38 2.5	7.758
6 2 45.87	2.2024	26 37 38.4	2.244	5	7 45 56.51	2.0797	22 30 13.9	7.861
6 4 57.98	2.2011	26 35 19.9	2.372	6	7 48 1.19	2.0763	22 22 19.2	7.963
6 7 10.00	2.1997	26 32 53.8	2.498	7	7 50 5.67	2.0730	22 14 18.4	8.064
6 9 21.94	2.1983	26 30 20.1	2.626	8	7 52 9.95	2.0697	22 6 11.5	8.166
6 11 33.79	2.1968	26 27 38.7	2.753	9	7 54 14.03	2.0663	21 57 58.5	8.266
6 13 45.55	2.1952	26 24 49.8	2.878	10	7 56 17.90	2.0628	21 49 39.6	8.365
6 15 57.21	2.1935	26 21 53.3	3.005	11	7 58 21.57	2.0594	21 41 14.7	8.463
6 18 8.77	2.1918	26 18 49.2	3.131	12	8 0 25.03	2.0560	21 32 44.0	8.561
6 20 20.23	2.1900	26 15 37.6	3.257	13	8 2 28.29	2.0527	21 24 7.4	8.658
6 22 31.57	2.1882	26 12 18.4	3.382	14	8 4 31.35	2.0493	21 15 25.0	8.754
6 24 42.81	2.1863	26 8 51.8	3.506	15	8 6 34.20	2.0458	21 6 36.9	8.850
6 26 53.93	2.1844	26 5 17.7	3.631	16	8 8 36.85	2.0425	20 57 43.0	8.946
6 29 4.94	2.1824	26 1 36.1	3.755	17	8 10 39.30	2.0392	20 48 43.4	9.040
6 31 15.82	2.1803	25 57 47.1	3.878	18	8 12 41.55	2.0358	20 39 38.2	9.133
6 33 26.57	2.1782	25 53 50.8	4.000	19	8 14 43.59	2.0323	20 30 27.5	9.225
6 35 37.20	2.1760	25 49 47.1	4.123	20	8 16 45.43	2.0290	20 21 11.2	9.318
6 37 47.69	2.1738	25 45 36.0	4.246	21	8 18 47.07	2.0257	20 11 49.4	9.408
6 39 58.05	2.1714	25 41 17.6	4.368	22	8 20 48.51	2.0223	20 2 22.2	9.498
6 42 8.26	2.1690	N. 25 36 51.9	4.489	23	8 22 49.75	2.0190	N. 19 52 49.6	9.588
WEDNESDAY 22.					FRIDAY 24.			
0 6 44 18.33	2.1667	N. 25 32 18.9	4.610	0	8 24 50.79	2.0157	N. 19 43 11.6	9.678
1 6 46 28.26	2.1642	25 27 38.7	4.730	1	8 26 51.63	2.0123	19 33 28.3	9.765
2 6 48 38.03	2.1616	25 22 51.3	4.849	2	8 28 52.27	2.0091	19 23 30.8	9.852
3 6 50 47.65	2.1591	25 17 56.8	4.968	3	8 30 52.72	2.0058	19 13 46.1	9.938
4 6 52 57.12	2.1565	25 12 55.1	5.088	4	8 32 52.97	2.0026	19 3 47.2	10.024
5 6 55 6.43	2.1538	25 7 46.3	5.206	5	8 34 53.03	1.9994	18 53 43.2	10.109
6 6 57 15.58	2.1511	25 2 30.4	5.324	6	8 36 52.90	1.9962	18 43 34.1	10.194
7 6 59 24.56	2.1483	24 57 7.4	5.441	7	8 38 52.57	1.9929	18 33 19.9	10.278
8 7 1 33.38	2.1456	24 51 37.5	5.557	8	8 40 52.05	1.9898	18 23 0.8	10.359
9 7 3 42.03	2.1428	24 46 0.6	5.673	9	8 42 51.35	1.9868	18 12 36.8	10.441
10 7 5 50.51	2.1398	24 40 16.8	5.788	10	8 44 50.46	1.9836	18 2 7.9	10.523
11 7 7 58.81	2.1369	24 34 26.0	5.903	11	8 46 49.38	1.9805	17 51 34.1	10.603
12 7 10 6.94	2.1340	24 28 28.4	6.017	12	8 48 48.12	1.9775	17 40 55.5	10.683
13 7 12 14.80	2.1310	24 22 24.0	6.131	13	8 50 46.68	1.9745	17 30 12.2	10.761
14 7 14 22.66	2.1280	24 16 12.7	6.244	14	8 52 45.06	1.9715	17 19 24.2	10.838
15 7 16 30.25	2.1250	24 9 54.7	6.357	15	8 54 43.26	1.9686	17 8 31.6	10.916
16 7 18 37.66	2.1219	24 3 29.9	6.468	16	8 56 41.29	1.9657	16 57 34.3	10.993
17 7 20 44.88	2.1188	23 56 58.5	6.579	17	8 58 39.14	1.9628	16 46 32.5	11.068
18 7 22 51.92	2.1157	23 50 20.4	6.690	18	9 0 36.82	1.9599	16 35 26.2	11.143
19 7 24 58.76	2.1124	23 43 35.7	6.800	19	9 2 34.33	1.9571	16 24 15.4	11.218
20 7 27 5.41	2.1093	23 36 44.4	6.909	20	9 4 31.67	1.9543	16 13 0.1	11.291
21 7 29 11.87	2.1061	23 29 46.6	7.018	21	9 6 28.85	1.9516	16 1 40.5	11.363
22 7 31 18.14	2.1028	23 22 42.3	7.126	22	9 8 25.86	1.9488	15 50 16.6	11.434
23 7 33 24.21	2.0996	23 15 31.5	7.233	23	9 10 22.71	1.9462	15 38 48.4	11.506
24 7 35 30.09	2.0963	N. 23 8 14.3	7.339	24	9 12 19.40	1.9436	N. 15 27 15.9	11.576

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	
SATURDAY 25.					MONDAY 27.				
0	h m s	s	° ' "	"	0	h m s	s	° ' "	
0	9 12 19.40	1.9436	N. 15 27 15.9	11.576	0	10 43 34.56	1.8818	N. 5 5 20.5	
1	9 14 15.94	1.9410	15 15 39.3	11.645	1	10 45 27.48	1.8822	4 51 16.9	
2	9 16 12.32	1.9384	15 3 58.5	11.714	2	10 47 20.42	1.8825	4 37 11.3	
3	9 18 8.55	1.9360	14 52 13.6	11.782	3	10 49 13.38	1.8830	4 23 3.9	
4	9 20 4.64	1.9336	14 40 24.7	11.848	4	10 51 6.38	1.8836	4 8 54.6	
5	9 22 0.58	1.9312	14 28 31.8	11.915	5	10 52 59.41	1.8842	3 54 43.6	
6	9 23 56.38	1.9288	14 16 34.9	11.981	6	10 54 52.48	1.8848	3 40 30.8	
7	9 25 52.04	1.9265	14 4 34.1	12.045	7	10 56 45.59	1.8856	3 26 16.3	
8	9 27 47.56	1.9243	13 52 29.5	12.109	8	10 58 38.75	1.8865	3 12 0.2	
9	9 29 42.95	1.9220	13 40 21.0	12.173	9	11 0 31.97	1.8875	2 57 42.5	
10	9 31 38.20	1.9198	13 28 8.7	12.236	10	11 2 25.25	1.8885	2 43 23.3	
11	9 33 33.33	1.9178	13 15 52.7	12.297	11	11 4 18.59	1.8896	2 29 2.5	
12	9 35 28.33	1.9157	13 3 33.1	12.358	12	11 6 12.00	1.8908	2 14 40.3	
13	9 37 23.21	1.9137	12 51 9.8	12.418	13	11 8 5.48	1.8920	2 0 16.7	
14	9 39 17.97	1.9118	12 38 42.9	12.478	14	11 9 59.04	1.8933	1 45 51.8	
15	9 41 12.62	1.9098	12 26 12.5	12.536	15	11 11 52.68	1.8948	1 31 25.6	
16	9 43 7.15	1.9079	12 13 38.6	12.593	16	11 13 46.41	1.8963	1 16 58.2	
17	9 45 1.57	1.9062	12 1 1.3	12.651	17	11 15 40.23	1.8978	1 2 29.5	
18	9 46 55.89	1.9045	11 48 20.5	12.708	18	11 17 34.15	1.8995	0 47 59.7	
19	9 48 50.11	1.9028	11 35 36.4	12.763	19	11 19 28.17	1.9013	0 33 28.9	
20	9 50 44.23	1.9012	11 22 48.9	12.818	20	11 21 22.30	1.9031	0 18 57.0	
21	9 52 38.25	1.8996	11 9 58.2	12.873	21	11 23 16.54	1.9050	N. 0 4 24.1	
22	9 54 32.18	1.8981	10 57 4.2	12.926	22	11 25 10.90	1.9070	S. 0 10 9.8	
23	9 56 26.02	1.8967	N. 10 44 7.1	12.978	23	11 27 5.38	1.9091	S. 0 24 44.5	
SUNDAY 26.					TUESDAY 28.				
0	9 58 19.78	1.8953	N. 10 31 6.9	13.039	0	11 28 59.99	1.9113	S. 0 39 20.0	
1	10 0 13.46	1.8940	10 18 3.6	13.081	1	11 30 54.73	1.9135	0 53 56.3	
2	10 2 7.06	1.8928	10 4 57.2	13.122	2	11 32 49.61	1.9159	1 8 33.3	
3	10 4 0.59	1.8915	9 51 47.8	13.161	3	11 34 44.64	1.9183	1 23 10.9	
4	10 5 54.04	1.8903	9 38 35.5	13.229	4	11 36 39.81	1.9208	1 37 49.2	
5	10 7 47.43	1.8893	9 25 20.3	13.278	5	11 38 35.14	1.9234	1 52 28.0	
6	10 9 40.76	1.8883	9 12 2.2	13.325	6	11 40 30.62	1.9261	2 7 7.3	
7	10 11 34.03	1.8873	8 58 41.3	13.371	7	11 42 26.27	1.9289	2 21 47.1	
8	10 13 27.24	1.8864	8 45 17.7	13.417	8	11 44 22.09	1.9318	2 36 27.2	
9	10 15 20.40	1.8856	8 31 51.3	13.462	9	11 46 18.08	1.9347	2 51 7.7	
10	10 17 13.51	1.8848	8 18 22.3	13.506	10	11 48 14.25	1.9378	3 5 48.4	
11	10 19 6.58	1.8843	8 4 50.6	13.550	11	11 50 10.61	1.9408	3 20 29.3	
12	10 20 59.62	1.8837	7 51 16.3	13.593	12	11 52 7.15	1.9440	3 35 10.3	
13	10 22 52.62	1.8831	7 37 39.5	13.634	13	11 54 3.89	1.9473	3 49 51.4	
14	10 24 45.59	1.8827	7 24 0.2	13.675	14	11 56 0.83	1.9508	4 4 32.5	
15	10 26 38.54	1.8823	7 10 18.5	13.715	15	11 57 57.98	1.9543	4 19 13.6	
16	10 28 31.46	1.8819	6 56 34.4	13.755	16	11 59 55.34	1.9578	4 33 54.6	
17	10 30 24.37	1.8817	6 42 47.9	13.794	17	12 1 52.92	1.9615	4 48 35.4	
18	10 32 17.26	1.8814	6 28 59.1	13.833	18	12 3 50.72	1.9653	5 3 16.0	
19	10 34 10.14	1.8813	6 15 8.0	13.870	19	12 5 48.75	1.9691	5 17 56.3	
20	10 36 3.02	1.8813	6 1 14.7	13.906	20	12 7 47.01	1.9730	5 32 36.3	
21	10 37 55.90	1.8813	5 47 19.3	13.942	21	12 9 45.51	1.9770	5 47 15.8	
22	10 39 48.78	1.8813	5 33 21.7	13.977	22	12 11 44.25	1.9812	6 1 54.8	
23	10 41 41.66	1.8815	5 19 22.1	14.010	23	12 13 43.25	1.9854	6 16 33.3	
24	10 43 34.56	1.8818	N. 5 5 20.5	14.043	24	12 15 42.50	1.9897	S. 6 31 11.2	

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
WEDNESDAY 29.				FRIDAY 31.				
h m s	s	° ' "	"	h m s	s	° ' "	"	
12 15 42.50	1.9897	S. 6 31 11.2	14.626	0 13 57 52.64	2.2997	S. 17 35 49.5	12.492	
12 17 42.01	1.9941	6 45 48.4	14.613	1 14 0 10.87	2.3080	17 48 16.5	12.408	
12 19 41.79	1.9986	7 0 24.8	14.600	2 14 2 29.60	2.3164	18 0 38.4	12.322	
12 21 41.84	2.0031	7 15 0.4	14.586	3 14 4 48.84	2.3248	18 12 55.1	12.233	
12 23 42.16	2.0078	7 29 35.1	14.570	4 14 7 8.58	2.3333	18 25 6.4	12.143	
12 25 42.77	2.0126	7 44 8.8	14.553	5 14 9 28.84	2.3419	18 37 12.2	12.050	
12 27 43.67	2.0174	7 58 41.5	14.536	6 14 11 49.61	2.3504	18 49 12.4	11.956	
12 29 44.86	2.0223	8 13 13.1	14.517	7 14 14 10.89	2.3590	19 1 6.9	11.860	
12 31 46.35	2.0274	8 27 43.5	14.496	8 14 16 32.69	2.3677	19 12 55.6	11.763	
12 33 48.15	2.0326	8 42 12.6	14.474	9 14 18 55.01	2.3764	19 24 38.4	11.663	
12 35 50.26	2.0378	8 56 40.4	14.452	10 14 21 17.86	2.3852	19 36 15.1	11.560	
12 37 52.68	2.0431	9 11 6.8	14.428	11 14 23 41.23	2.3939	19 47 45.6	11.455	
12 39 55.43	2.0485	9 25 31.7	14.402	12 14 26 5.13	2.4028	19 59 9.7	11.349	
12 41 58.50	2.0540	9 39 55.0	14.375	13 14 28 29.56	2.4115	20 10 27.5	11.242	
12 44 1.91	2.0596	9 54 16.7	14.348	14 14 30 54.51	2.4203	20 21 38.7	11.131	
12 46 5.65	2.0653	10 8 36.7	14.318	15 14 33 19.99	2.4292	20 32 43.2	11.018	
12 48 9.74	2.0710	10 22 54.8	14.287	16 14 35 46.01	2.4381	20 43 40.9	10.904	
12 50 14.17	2.0768	10 37 11.1	14.255	17 14 38 12.56	2.4469	20 54 31.7	10.788	
12 52 18.96	2.0828	10 51 25.4	14.221	18 14 40 39.64	2.4558	21 5 15.4	10.668	
12 54 24.10	2.0888	11 5 37.6	14.186	19 14 43 7.25	2.4647	21 15 51.9	10.548	
12 56 29.61	2.0949	11 19 47.7	14.149	20 14 45 35.40	2.4736	21 26 21.2	10.426	
12 58 35.49	2.1012	11 33 55.5	14.112	21 14 48 4.08	2.4824	21 36 43.0	10.301	
13 0 41.75	2.1075	11 48 1.1	14.073	22 14 50 33.29	2.4913	21 46 57.3	10.174	
13 2 48.39	2.1138	S. 12 2 4.3	14.033	23 14 53 3.03	2.5002	S. 21 57 3.9	10.045	
THURSDAY 30.				SATURDAY, JANUARY 1, 1916.				
h m s	s	° ' "	"	h m s	s	° ' "	"	
13 4 55.41	2.1203	S. 12 16 5.0	13.990	0 14 55 33.31	2.5091	S. 22 7 2.7	9.924	
13 7 2.83	2.1269	12 30 3.1	13.947	PHASES OF THE MOON.				
13 9 10.64	2.1335	12 43 58.6	13.902					
13 11 18.85	2.1403	12 57 51.3	13.855					
13 13 27.47	2.1472	13 11 41.2	13.807					
13 15 36.51	2.1541	13 25 28.1	13.757					
13 17 45.96	2.1610	13 39 12.0	13.705					
13 19 55.83	2.1681	13 52 52.7	13.652					
13 22 6.13	2.1753	14 6 30.2	13.598					
13 24 16.86	2.1824	14 20 4.4	13.542					
13 26 28.02	2.1898	14 33 35.2	13.484					
13 28 39.63	2.1972	14 47 2.5	13.424					
13 30 51.68	2.2046	15 0 26.1	13.363					
13 33 4.18	2.2122	15 13 46.0	13.300					
13 35 17.14	2.2198	15 27 2.1	13.236					
13 37 30.56	2.2275	15 40 14.3	13.169					
13 39 44.44	2.2352	15 53 22.4	13.101					
13 41 58.78	2.2430	16 6 26.4	13.032					
13 44 13.60	2.2510	16 19 26.2	12.960					
13 46 28.90	2.2589	16 32 21.6	12.886					
13 48 44.67	2.2669	16 45 12.5	12.811					
13 51 0.93	2.2751	16 57 58.9	12.734					
13 53 17.68	2.2832	17 10 40.6	12.655					
13 55 34.91	2.2913	17 23 17.5	12.574					
13 57 52.64	2.2997	S. 17 35 49.5	12.492					

● New Moon Dec. 6 6 3.7

☾ First Quarter 12 23 38.4

○ Full Moon 21 0 52.3

☾ Last Quarter 29 0 58.8

☾ Perigee Dec. 6 13.3

☾ Apogee 20 12.6

GREENWICH MEAN TIME.

JANUARY.						FEBRUARY.					
Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.	Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.
	Noon.	Noon.	Noon.	Noon.			Noon.	Noon.	Noon.	Noon.	
	h m s	s	° ' "	"	h m		h m s	s	° ' "	"	h
1	18 33 15.71	+17.599	-24 49 22.6	+ 2.94	23 56.1	1	22 4 2.70	+13.139	-12 26 11.1	+102.96	1 2
2	18 40 18.69	17.649	24 47 29.0	6.53	23 59.3	2	22 9 9.05	12.375	11 45 8.9	102.09	1 1
3	18 47 22.83	17.695	24 44 8.7	10.16	...	3	22 13 55.91	11.514	11 437.4	100.39	1 2
4	18 54 28.01	17.736	24 39 20.7	13.84	0 2.4	4	22 18 20.92	10.552	10 24 57.5	97.78	1 2
5	19 1 34.12	17.772	24 33 4.0	17.56	0 5.6	5	22 22 21.59	9.486	9 46 31.9	94.18	1 2
6	19 8 41.02	+17.802	-24 25 17.6	+ 21.31	0 8.8	6	22 25 55.38	+ 8.312	- 9 9 44.9	+ 89.55	1 2
7	19 15 48.58	17.827	24 16 0.6	25.10	0 12.0	7	22 28 59.76	7.035	8 35 2.3	83.82	1 2
8	19 22 56.66	17.846	24 5 12.2	28.94	0 15.2	8	22 31 32.28	5.659	8 2 50.2	77.00	1 2
9	19 30 5.11	17.858	23 52 51.6	32.79	0 18.4	9	22 33 30.68	4.194	7 33 34.9	69.09	1 1
10	19 37 13.77	17.863	23 38 58.2	36.67	0 21.6	10	22 34 53.02	2.657	7 7 42.1	60.14	1 1
11	19 44 22.46	+17.860	-23 23 31.3	+ 40.58	0 24.8	11	22 35 37.78	+ 1.066	- 6 45 36.0	+ 50.22	1 1
12	19 51 30.99	17.850	23 6 30.4	44.50	0 28.0	12	22 35 44.01	- 0.550	6 27 38.1	39.48	1
13	19 58 39.17	17.830	22 47 55.2	48.44	0 31.2	13	22 35 11.44	2.161	6 14 6.4	28.07	1
14	20 5 46.76	17.801	22 27 45.4	52.38	0 34.4	14	22 34 0.63	3.731	6 5 14.3	16.21	1
15	20 12 53.53	17.761	22 6 1.1	56.31	0 37.6	15	22 32 13.03	5.219	6 1 9.5	+ 4.17	0 5
16	20 19 59.21	+17.710	-21 42 42.4	+ 60.24	0 40.8	16	22 29 51.08	- 6.586	- 6 1 53.3	- 7.78	0 4
17	20 27 3.49	17.645	21 17 49.7	64.14	0 43.9	17	22 26 58.18	7.791	6 7 19.5	19.31	0 4
18	20 34 6.05	17.566	20 51 23.7	68.01	0 47.0	18	22 23 38.68	8.797	6 17 14.5	30.12	0 5
19	20 41 6.51	17.470	20 23 25.4	71.83	0 50.0	19	22 19 57.73	9.574	6 31 17.3	39.91	0 5
20	20 48 4.46	17.356	19 53 56.2	75.59	0 53.0	20	22 16 1.11	10.100	6 49 0.2	48.42	0 1
21	20 54 59.43	+17.221	-19 22 58.0	+ 79.25	0 56.0	21	22 11 55.00	-10.364	- 7 9 49.9	- 55.46	0 1
22	21 1 50.88	17.062	18 50 33.1	82.80	0 58.9	22	22 7 45.68	10.368	7 33 9.5	60.90	0 3
23	21 8 38.19	16.876	18 16 44.7	86.21	1 1.8	23	22 3 39.28	10.124	7 58 19.9	64.69	23 4
24	21 15 20.66	16.658	17 41 36.5	89.44	1 4.5	24	21 59 41.51	9.654	8 24 41.8	66.87	23 3
25	21 21 57.49	16.405	17 5 13.2	92.46	1 7.2	25	21 55 57.45	8.987	8 51 37.8	67.55	23 3
26	21 28 27.77	+16.111	-16 27 40.5	+ 95.22	1 9.7	26	21 52 31.44	- 8.156	- 9 18 33.5	- 66.88	23 3
27	21 34 50.46	15.771	15 49 5.2	97.67	1 12.2	27	21 49 26.95	7.199	9 44 58.7	65.03	23 3
28	21 41 4.37	15.378	15 9 35.5	99.74	1 14.5	28	21 46 46.61	6.150	10 10 27.4	62.21	23 3
29	21 47 8.14	14.926	14 29 21.1	101.38	1 16.6	29	21 44 32.22	5.042	10 34 38.6	58.61	23 3
30	21 53 0.28	14.407	13 48 33.2	102.52	1 18.5	30	21 42 44.84	3.904	10 57 15.7	54.40	23 3
31	21 58 39.09	+13.814	-13 7 24.9	+103.07	1 20.2	31	21 41 24.90	- 2.759	-11 18 6.2	- 49.75	22 3
32	22 4 2.70	+13.139	-12 26 11.1	+102.96	1 21.7	32	21 40 32.31	- 1.628	-11 37 1.0	- 44.78	22 3
Day of the Month.						Day of the Month.					
1st. 6th. 11th. 16th. 21st. 26th. 31st.						5th. 10th. 15th. 20th.					
Semidiameter						Semidiameter					
Horizontal Parallax						Horizontal Parallax					

NOTE.—The sign + indicates north declinations; the sign — indicates south declinations.

GREENWICH MEAN TIME.

MARCH.						APRIL.						
Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.	Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.	
	Noon.	Noon.	Noon.	Noon.	h m		Noon.	Noon.	Noon.	Noon.	h m	
1	21 44 32.22	- 5.042	-10 34 38.6	-58.61	23 6.2	1	23 11 3.16	+13.305	- 7 45 3.1	+ 74.77	22 37.3	
2	21 42 44.84	3.904	10 57 15.7	54.40	23 0.9	2	23 16 24.86	13.593	7 14 30.8	77.91	22 38.8	
3	21 41 24.90	2.759	11 18 6.2	49.75	22 56.1	3	23 21 51.26	13.696	6 42 43.8	81.00	22 40.4	
4	21 40 32.31	1.628	11 37 1.0	44.78	22 51.7	4	23 27 22.25	13.886	6 0 43.5	84.03	22 42.1	
5	21 40 6.53	- 0.527	11 53 54.1	39.62	22 47.8	5	23 32 57.79	14.074	5 35 31.1	87.00	22 43.8	
6	21 40 6.70	+ 0.534	-12 8 42.0	-34.36	22 44.3	6	23 38 37.82	+14.261	- 5 0 7.8	+ 89.92	22 45.6	
7	21 40 31.77	1.547	12 21 23.0	29.06	22 41.1	7	23 44 22.34	14.449	4 23 35.2	92.79	22 47.5	
8	21 41 20.54	2.507	12 31 56.8	23.77	22 38.3	8	23 50 11.36	14.637	3 45 54.5	95.60	22 49.4	
9	21 42 31.67	3.470	12 40 24.4	18.54	22 35.9	9	23 56 4.92	14.828	3 7 7.1	98.34	22 51.4	
10	21 44 3.81	4.258	12 46 47.2	13.38	22 33.8	10	0 2 3.10	15.021	2 27 14.4	101.04	22 53.5	
11	21 45 55.61	+ 5.050	-12 51 7.5	- 8.32	22 32.0	11	0 8 5.95	+15.218	- 1 46 17.8	+103.67	22 55.7	
12	21 48 5.75	5.787	12 53 27.7	- 3.38	22 30.5	12	0 14 13.60	15.420	1 4 18.8	106.23	22 58.0	
13	21 50 32.94	6.472	12 53 50.6	+ 1.45	22 29.2	13	0 20 26.17	15.628	- 0 21 19.1	108.73	23 0.4	
14	21 53 15.97	7.106	12 52 10.0	6.16	22 28.2	14	0 26 43.81	15.842	+ 0 22 39.5	111.14	23 2.8	
15	21 56 13.67	7.695	12 48 55.6	10.76	22 27.5	15	0 33 6.66	16.063	1 7 35.1	113.47	23 5.3	
16	21 59 24.97	+ 8.240	-12 43 43.2	+15.25	22 27.0	16	0 39 34.93	+16.292	+ 1 53 25.7	+115.73	23 7.9	
17	22 2 48.87	8.745	12 36 44.5	19.62	22 26.6	17	0 46 8.79	16.530	2 40 9.1	117.87	23 10.7	
18	22 6 24.44	9.213	12 28 2.2	23.89	22 26.4	18	0 52 48.46	16.776	3 27 42.7	119.91	23 13.5	
19	22 10 10.81	9.646	12 17 38.8	28.05	22 26.4	19	0 59 34.14	17.031	4 16 3.6	121.81	23 16.4	
20	22 14 7.21	10.049	12 5 36.7	32.12	22 26.5	20	1 6 26.06	17.295	5 5 8.7	123.58	23 19.4	
21	22 18 12.93	+10.423	-11 51 58.1	+36.09	22 26.8	21	1 13 24.42	+17.560	+ 5 54 54.3	+125.19	23 22.5	
22	22 22 27.30	10.771	11 36 45.3	39.97	22 27.2	22	1 20 29.45	17.851	6 45 16.5	126.62	23 25.8	
23	22 26 49.74	11.095	11 20 0.3	43.77	22 27.8	23	1 27 41.32	18.140	7 36 10.5	127.84	23 29.2	
24	22 31 19.71	11.399	11 1 45.1	47.49	22 28.5	24	1 35 0.22	18.436	8 27 31.1	128.84	23 32.7	
25	22 35 56.74	11.684	10 42 1.5	51.13	22 29.2	25	1 42 26.28	18.736	9 19 12.6	129.57	23 36.3	
26	22 40 40.40	+11.951	-10 20 51.4	+54.70	22 30.1	26	1 49 59.59	+19.040	+10 11 8.1	+130.00	23 40.0	
27	22 45 30.30	12.204	9 58 16.5	58.20	22 31.1	27	1 57 40.19	19.343	11 3 10.3	130.73	23 43.9	
28	22 50 26.11	12.444	9 34 18.3	61.64	22 32.2	28	2 5 28.06	19.644	11 55 11.0	129.87	23 47.9	
29	22 55 27.54	12.673	9 8 58.3	65.01	22 33.3	29	2 13 23.07	19.938	12 47 0.9	129.22	23 52.0	
30	23 0 34.33	12.891	8 42 18.2	68.32	22 34.6	30	2 21 25.01	20.221	13 38 30.0	128.12	23 56.2	
31	23 5 46.27	+13.102	- 8 14 19.3	+71.57	22 35.9	31	2 29 33.54	+20.488	+14 29 27.6	+126.58	...	
32	23 11 3.16	+13.305	- 7 45 3.1	+74.77	22 37.3	32	2 37 48.23	+20.733	+15 19 42.2	+124.54	0 0.6	
Day of the Month.						Day of the Month.						
	3d.	7th.	12th.	17th.	22d.		1st.	6th.	11th.	16th.	21st.	26th.
Semidiameter	5.02	4.61	4.21	3.85	3.55	Semidiameter	3.09	2.92	2.78	2.66	2.57	2.52
Horizontal Parallax	13.22	12.16	11.09	10.14	9.35	Horizontal Parallax	8.15	7.69	7.31	7.00	6.77	6.64

NOTE.—The sign + prefixed to the hourly change of declination indicates that north declinations are increasing or south declinations decreasing; the sign — indicates that south declinations are increasing.

GREENWICH MEAN TIME.

MAY.						JUNE.								
Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.	Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.			
	Noon.	Noon.	Noon.	Noon.			Noon.	Noon.	Noon.	Noon.				
	h m s	s	° ' "	"	h m		h m s	s	° ' "	"	h			
1	2 29 33.54	+20.488	+14 29 27.6	+126.58	...	1	6 13 50.78	+10.214	+25 5 13.0	-23.31	1 38			
2	2 37 48.23	20.733	15 19 42.2	124.54	0 0.6	2	6 17 47.06	9.473	24 55 20.7	26.01	1 38			
3	2 46 8.48	20.950	16 9 1.8	122.00	0 5.0	3	6 21 25.37	8.717	24 44 26.6	28.46	1 37			
4	2 54 33.58	21.136	16 57 13.8	118.92	0 9.5	4	6 24 45.37	7.947	24 32 36.3	30.69	1 37			
5	3 3 2.69	21.283	17 44 5.8	115.33	0 14.0	5	6 27 46.72	7.163	24 19 55.2	32.70	1 36			
6	3 11 34.84	+21.388	+18 29 25.5	+111.23	0 18.6	6	6 30 29.08	+6.365	+24 6 28.5	-34.49	1 35			
7	3 20 8.95	21.446	19 13 1.0	106.65	0 23.2	7	6 32 52.16	5.556	23 52 21.6	36.05	1 33			
8	3 28 43.86	21.454	19 54 41.1	101.63	0 27.8	8	6 34 55.67	4.735	23 37 39.9	37.39	1 31			
9	3 37 18.34	21.411	20 34 15.8	96.20	0 32.5	9	6 36 39.39	3.906	23 22 28.6	38.52	1 29			
10	3 45 51.15	21.314	21 11 36.3	90.46	0 37.1	10	6 38 3.15	3.072	23 6 52.9	39.43	1 26			
11	3 54 21.01	+21.165	+21 46 35.4	+84.43	0 41.7	11	6 39 6.82	+2.235	+22 50 58.0	-40.12	1 24			
12	4 2 46.68	20.965	22 19 7.3	78.20	0 46.2	12	6 39 50.41	1.398	22 34 49.1	40.59	1 20			
13	4 11 6.94	20.715	22 49 7.9	71.83	0 50.6	13	6 40 13.98	+0.567	22 18 31.3	40.85	1 17			
14	4 19 20.64	20.419	23 16 34.6	65.39	0 54.9	14	6 40 17.74	-0.252	22 2 10.1	40.88	1 13			
15	4 27 26.71	20.080	23 41 26.5	58.94	0 59.1	15	6 40 2.04	1.053	21 45 50.7	40.70	1 9			
16	4 35 24.14	+19.700	+24 3 43.9	+52.52	1 3.1	16	6 39 27.41	-1.828	+21 29 38.5	-40.28	1 4			
17	4 43 12.01	19.284	24 23 28.3	46.20	1 7.0	17	6 38 34.54	2.571	21 13 38.9	39.64	0 59			
18	4 50 49.48	18.834	24 40 42.5	40.01	1 10.7	18	6 37 24.33	3.272	20 57 57.6	38.76	0 54			
19	4 58 15.79	18.354	24 55 30.0	33.98	1 14.1	19	6 35 57.88	3.922	20 42 40.3	37.64	0 49			
20	5 5 30.25	17.846	25 7 54.9	28.13	1 17.4	20	6 34 16.53	4.512	20 27 52.6	36.29	0 43			
21	5 12 32.22	+17.314	+25 18 2.1	+22.50	1 20.5	21	6 32 21.86	-5.032	+20 13 40.4	-34.68	0 37			
22	5 19 21.13	16.759	25 25 56.9	17.10	1 23.4	22	6 30 15.63	5.474	20 0 9.7	32.83	0 31			
23	5 25 56.46	16.182	25 31 44.8	11.94	1 26.0	23	6 27 59.81	5.829	19 47 26.3	30.74	0 25			
24	5 32 17.71	15.586	25 35 31.8	7.02	1 28.4	24	6 25 36.59	6.090	19 35 36.0	28.41	0 19			
25	5 38 24.43	14.971	25 37 23.7	+2.35	1 30.6	25	6 23 8.28	6.252	19 24 44.4	25.86	0 12			
26	5 44 16.20	+14.340	+25 37 26.6	-2.06	1 32.5	26	6 20 37.30	-6.311	+19 14 56.8	-23.08	0 6			
27	5 49 52.61	13.692	25 35 46.6	6.23	1 34.1	27	6 18 6.16	6.266	19 6 18.3	20.10	0 0			
28	5 55 13.26	13.027	25 32 29.7	10.14	1 35.5	28	6 15 37.37	6.116	18 58 53.3	16.95	23 53			
29	6 0 17.77	12.347	25 27 41.9	13.80	1 36.6	29	6 13 13.42	5.863	18 52 45.7	13.66	23 47			
30	6 5 5.77	11.651	25 21 29.3	17.21	1 37.4	30	6 10 56.73	5.511	18 47 58.6	10.25	23 35			
31	6 9 36.89	+10.940	+25 13 57.8	-20.38	1 38.0	31	6 8 49.59	-5.068	+18 44 34.4	-6.75	23 29			
32	6 13 50.78	+10.214	+25 5 13.0	-23.31	1 38.3	32	6 6 54.12	-4.340	+18 42 34.5	-3.23	23 23			
Day of the Month.	1st.	6th.	11th.	16th.	21st.	26th.	31st.	Day of the Month.	5th.	10th.	15th.	20th.	25th.	30th.
Semidiameter . . .	2.52	2.58	2.71	2.93	3.22	3.59	4.02	Semidiameter . . .	4.50	5.01	5.49	5.85	5.99	5
Horizontal Parallax	6.63	6.79	7.15	7.72	8.50	9.46	10.59	Horizontal Parallax	11.86	13.20	14.47	15.43	15.79	15

NOTE.—The sign + indicates north declinations.

GREENWICH MEAN TIME.

JULY.						AUGUST.					
Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.	Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.
	Noon.	Noon.	Noon.	Noon.			Noon.	Noon.	Noon.	Noon.	
	h m s	s	° ' "	"	h m		h m s	s	° ' "	"	h m
1	6 8 49.59	-5.068	+18 44 34.4	-6.75	23 29.3	1	7 45 46.14	+20.236	+21 44 26.7	-23.05	23 13.8
2	6 6 54.12	4.540	18 42 34.5	-3.23	23 23.6	2	7 53 56.65	20.626	21 33 54.9	29.62	23 18.2
3	6 5 12.29	3.934	18 41 59.5	+0.30	23 18.3	3	8 2 15.58	20.938	21 20 44.1	36.28	23 22.7
4	6 3 45.86	3.258	18 42 48.9	3.80	23 13.2	4	8 10 41.03	21.170	21 4 53.2	42.95	23 27.3
5	6 2 36.40	2.522	18 45 1.3	7.22	23 8.4	5	8 19 11.10	21.323	20 46 23.2	49.53	23 31.9
6	6 1 45.23	-1.734	+18 48 34.4	+10.52	23 3.9	6	8 27 43.91	+21.399	+20 25 16.8	-55.97	23 36.5
7	6 1 13.49	-0.904	18 53 24.9	13.66	22 59.8	7	8 36 17.69	21.404	20 1 38.5	62.18	23 41.1
8	6 1 2.14	-0.037	18 59 28.7	16.62	22 56.0	8	8 44 50.79	21.343	19 35 34.6	68.10	23 45.7
9	6 1 11.94	+0.858	19 6 41.0	19.36	22 52.6	9	8 53 21.70	21.223	19 7 12.4	73.69	23 50.3
10	6 1 43.49	1.775	19 14 56.1	21.85	22 49.5	10	9 1 49.08	21.051	18 36 40.3	78.92	23 54.7
11	6 2 37.26	+2.709	+19 24 7.6	+24.06	22 46.8	11	9 10 11.79	+20.835	+18 4 7.4	-83.76	23 59.0
12	6 3 53.60	3.654	19 34 8.5	25.97	22 44.5	12	9 18 28.86	20.582	17 29 43.3	88.19	...
13	6 5 32.73	4.607	19 44 51.5	27.55	22 42.6	13	9 26 39.50	20.300	16 53 37.7	92.21	0 3.3
14	6 7 34.80	5.566	19 56 8.4	28.80	22 41.1	14	9 34 43.09	19.996	16 16 0.3	95.84	0 7.4
15	6 9 59.89	6.525	20 7 50.8	29.67	22 39.9	15	9 42 39.17	19.675	15 37 0.5	99.08	0 11.4
16	6 12 47.99	+7.484	+20 19 49.6	+30.17	22 39.1	16	9 50 27.42	+19.344	+14 56 47.4	-101.95	0 15.3
17	6 15 59.06	8.439	20 31 55.5	30.25	22 38.7	17	9 58 7.63	19.006	14 15 29.8	104.46	0 19.0
18	6 19 33.00	9.388	20 43 58.5	29.92	22 38.7	18	10 5 39.70	18.666	13 33 15.9	106.64	0 22.6
19	6 23 29.65	10.332	20 55 48.4	29.16	22 39.0	19	10 13 3.61	18.328	12 50 13.4	108.52	0 26.1
20	6 27 48.83	11.263	21 7 14.4	27.94	22 39.7	20	10 20 19.43	17.992	12 6 29.4	110.10	0 29.4
21	6 32 30.26	+12.185	+21 18 5.6	+26.25	22 40.8	21	10 27 27.26	+17.662	+11 22 10.5	-111.43	0 32.6
22	6 37 33.61	13.091	21 28 10.7	24.09	22 42.3	22	10 34 27.26	17.340	10 37 22.8	112.51	0 35.7
23	6 42 58.49	13.979	21 37 18.0	21.43	22 44.1	23	10 41 19.62	17.025	9 52 12.0	113.36	0 38.6
24	6 48 44.40	14.843	21 45 15.6	18.28	22 46.3	24	10 48 4.56	16.721	9 6 43.1	114.01	0 41.4
25	6 54 50.72	15.679	21 51 51.6	14.64	22 48.8	25	10 54 42.31	16.426	8 21 1.0	114.47	0 44.1
26	7 1 16.73	+16.482	+21 56 54.3	+10.50	22 51.5	26	11 1 13.12	+16.142	+7 35 9.9	-114.76	0 46.7
27	7 8 1.55	17.246	22 0 12.0	5.89	22 54.6	27	11 7 37.23	15.868	6 49 13.8	114.89	0 49.1
28	7 15 4.15	17.963	22 1 33.6	+0.83	22 58.0	28	11 13 54.89	15.605	6 3 16.3	114.87	0 51.5
29	7 22 23.34	18.627	22 0 48.7	-4.64	23 1.6	29	11 20 6.35	15.351	5 17 20.9	114.72	0 53.7
30	7 29 57.77	19.231	21 57 47.8	10.49	23 5.5	30	11 26 11.84	15.107	4 31 30.6	114.45	0 55.9
31	7 37 45.92	+19.770	+21 52 22.7	-16.65	23 9.6	31	11 32 11.60	+14.873	+3 45 48.4	-114.05	0 57.9
32	7 45 46.14	+20.236	+21 44 26.7	-23.05	23 13.8	32	11 38 5.85	+14.648	+3 0 16.9	-113.56	0 59.9
Day of the Month.						Day of the Month.					
5th. 10th. 15th. 20th. 25th. 30th.						4th. 9th. 14th. 19th. 24th. 29th.					
Semidiameter 5.41 4.86 4.28 3.74 3.29 2.94						Semidiameter 2.70 2.55 2.47 2.45 2.47 2.51					
Horizontal Parallax 14.26 12.79 11.26 9.85 8.67 7.75						Horizontal Parallax 7.11 6.71 6.51 6.45 6.50 6.62					

NOTE.—The sign + prefixed to the hourly change of declination indicates that north declinations are increasing; the sign - indicates that north declinations are decreasing.

GREENWICH MEAN TIME.

SEPTEMBER.						OCTOBER.						
Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Merid- ian Pas- sage.	Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.		
	Noon.	Noon.	Noon.	Noon.			Noon.	Noon.	Noon.	Noon.		
	h m s	s	" ' "	"	h m		h m s	s	" ' "	"		
1	11 38 5.85	+14.648	+ 3 0 16.9	-113.56	0 59.9	1	13 57 57.74	+ 7.508	-15 22 32.7	- 53.61		
2	11 43 54.80	14.431	2 14 58.6	112.96	1 1.8	2	14 0 51.59	6.971	15 43 6.0	49.10		
3	11 49 38.64	14.223	1 29 55.9	112.26	1 3.6	3	14 3 31.93	6.381	16 1 46.9	44.25		
4	11 55 17.56	14.022	0 45 11.1	111.47	1 5.3	4	14 5 57.42	5.733	16 18 26.5	38.99		
5	12 0 51.73	13.827	+ 0 0 46.3	110.58	1 6.9	5	14 8 6.59	5.020	16 32 54.8	33.30		
6	12 6 21.29	+13.637	- 0 43 16.4	-109.62	1 8.4	6	14 9 57.86	+ 4.240	-16 45 0.8	- 27.12		
7	12 11 46.38	13.454	1 26 55.1	108.58	1 9.9	7	14 11 29.55	3.388	16 54 32.4	20.43		
8	12 17 7.12	13.275	2 10 7.9	107.47	1 11.3	8	14 12 39.90	2.462	17 1 16.5	13.15		
9	12 22 23.60	13.098	2 52 52.9	106.27	1 12.6	9	14 13 27.09	1.458	17 4 58.6	- 5.25		
10	12 27 35.90	12.926	3 35 8.2	104.99	1 13.9	10	14 13 49.30	+ 0.381	17 5 23.5	+ 3.29		
11	12 32 44.07	+12.755	- 4 16 51.9	-103.64	1 15.1	11	14 13 44.81	- 0.766	-17 2 15.3	+ 12.51		
12	12 37 48.14	12.584	4 58 2.2	102.21	1 16.2	12	14 13 12.05	1.973	16 55 18.0	22.38		
13	12 42 48.12	12.414	5 38 37.2	100.69	1 17.3	13	14 12 9.74	3.225	16 44 16.2	32.87		
14	12 47 44.00	12.242	6 18 35.0	99.10	1 18.3	14	14 10 37.07	4.500	16 28 55.9	43.90		
15	12 52 35.74	12.069	6 57 53.5	97.42	1 19.2	15	14 8 33.81	5.769	16 9 6.4	55.28		
16	12 57 23.26	+11.891	- 7 36 30.7	- 95.67	1 20.0	16	14 6 0.55	- 6.993	-15 44 41.8	+ 66.77		
17	13 2 6.46	11.708	8 14 24.6	93.81	1 20.8	17	14 2 58.88	8.128	15 15 43.1	78.06		
18	13 6 45.20	11.519	8 51 32.8	91.86	1 21.5	18	13 59 31.52	9.124	14 42 20.3	88.70		
19	13 11 19.31	11.322	9 27 53.1	89.81	1 22.1	19	13 55 42.45	9.928	14 4 54.6	98.21		
20	13 15 48.58	11.115	10 3 22.9	87.65	1 22.6	20	13 51 36.89	10.490	13 23 59.8	106.04		
21	13 20 12.76	+10.897	-10 37 59.6	- 85.38	1 23.1	21	13 47 21.20	-10.765	-12 40 22.6	+111.64		
22	13 24 31.54	10.666	11 11 40.3	82.99	1 23.5	22	13 43 2.65	10.724	11 55 2.1	114.57		
23	13 28 44.58	10.418	11 44 21.9	80.45	1 23.8	23	13 38 49.04	10.353	11 9 6.6	114.52		
24	13 32 51.46	10.152	12 16 1.1	77.79	1 23.9	24	13 34 48.26	9.658	10 23 50.0	111.33		
25	13 36 51.70	9.865	12 46 34.3	74.95	1 24.0	25	13 31 7.81	8.665	9 40 27.0	105.09		
26	13 40 44.77	+ 9.554	-13 15 57.5	+ 71.95	1 23.9	26	13 27 54.37	- 7.416	- 9 0 7.8	+ 96.07		
27	13 44 30.05	9.315	13 44 6.3	68.75	1 23.7	27	13 25 13.45	5.965	8 23 53.6	84.76		
28	13 48 6.83	8.845	14 10 55.8	65.34	1 23.4	28	13 23 9.16	4.374	7 52 33.3	71.69		
29	13 51 34.31	8.440	14 36 20.7	61.70	1 22.9	29	13 21 44.16	2.701	7 26 41.6	57.48		
30	13 54 51.61	7.995	15 0 15.2	57.80	1 22.2	30	13 20 59.69	- 1.005	7 6 39.1	42.69		
31	13 57 57.74	+ 7.508	-15 22 32.7	- 53.61	1 21.4	31	13 20 55.73	+ 0.667	- 6 52 33.1	+ 27.85		
32	14 0 51.59	+ 6.971	-15 43 6.0	- 49.10	1 20.3	32	13 21 31.21	+ 2.276	- 6 44 19.3	+ 13.40		
Day of the Month.						Day of the Month.						
	3d.	8th.	13th.	18th.	23d.	28th.		3d.	8th.	13th.	18th.	23d.
Semidiameter	2.58	2.68	2.80	2.96	3.15	3.40	Semidiameter	3.72	4.13	4.59	4.95	4.9
Horizontal Parallax	6.81	7.06	7.38	7.79	8.31	8.97	Horizontal Parallax	9.82	10.87	12.06	13.02	13.0

NOTE.—The sign + indicates north declinations; the sign - indicates south declinations.

GREENWICH MEAN TIME.

NOVEMBER.						DECEMBER.								
Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.	Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.			
	Noon.	Noon.	Noon.	Noon.			Noon.	Noon.	Noon.	Noon.				
	h m s	s	° ' "	"	h m		h m s	s	° ' "	"	h m			
1	13 21 31.21	+ 2.276	- 6 44 19.3	+13.40	22 40.2	1	15 52 10.86	+16.060	-20 0 8.8	-66.58	23 17.5			
2	13 22 44.25	3.793	6 41 44.2	- 0.33	22 38.0	2	15 58 37.39	16.150	20 26 18.6	64.23	23 20.1			
3	13 24 32.39	5.198	6 44 27.5	13.10	22 36.4	3	16 5 6.05	16.238	20 51 31.1	61.80	23 22.7			
4	13 26 52.82	6.483	6 52 4.2	24.77	22 35.2	4	16 11 36.83	16.326	21 15 44.4	59.29	23 25.3			
5	13 29 42.58	7.641	7 4 6.9	35.25	22 34.5	5	16 18 9.70	16.412	21 38 56.7	56.71	23 27.9			
6	13 32 58.64	+ 8.677	- 7 20 6.8	-44.54	22 34.2	6	16 24 44.63	+16.498	-22 1 6.2	-54.06	23 30.6			
7	13 36 38.11	9.593	7 39 35.1	52.64	22 34.3	7	16 31 21.61	16.583	22 22 11.2	51.34	23 33.3			
8	13 40 38.24	10.400	8 2 4.3	59.61	22 34.6	8	16 38 0.62	16.667	22 42 10.2	48.56	23 36.1			
9	13 44 56.48	11.105	8 27 8.2	65.54	22 35.2	9	16 44 41.63	16.750	23 1 1.6	45.71	23 38.9			
10	13 49 30.55	11.719	8 54 22.6	70.50	22 36.0	10	16 51 24.61	16.831	23 18 43.8	42.80	23 41.7			
11	13 54 18.38	+12.254	- 9 23 25.2	-74.57	22 37.1	11	16 58 9.53	+16.911	-23 35 15.5	-39.83	23 44.5			
12	13 59 18.18	12.718	9 53 56.0	77.87	22 38.3	12	17 4 56.35	16.990	23 50 35.1	36.80	23 47.4			
13	14 4 28.37	13.121	10 25 37.2	80.45	22 39.7	13	17 11 45.04	17.067	24 4 41.2	33.71	23 50.3			
14	14 9 47.58	13.471	10 58 12.6	82.40	22 41.2	14	17 18 35.55	17.142	24 17 32.5	30.56	23 53.2			
15	14 15 14.63	13.776	11 31 28.1	83.80	22 42.8	15	17 25 27.83	17.214	24 29 7.5	27.35	23 56.2			
16	14 20 48.53	+14.043	-12 5 11.2	-84.71	22 44.5	16	17 32 21.82	+17.284	-24 39 24.8	-24.09	23 59.2			
17	14 26 28.44	14.278	12 39 10.9	85.19	22 46.3	17	17 39 17.44	17.350	24 48 23.2	20.77	...			
18	14 32 13.65	14.485	13 13 17.4	85.29	22 48.2	18	17 46 14.62	17.414	24 56 1.2	17.39	0 2.2			
19	14 38 3.55	14.670	13 47 22.2	85.06	22 50.2	19	17 53 13.29	17.474	25 2 17.6	13.97	0 5.2			
20	14 43 57.64	14.835	14 21 17.9	84.53	22 52.2	20	18 0 13.34	17.529	25 7 11.1	10.48	0 8.3			
21	14 49 55.51	+14.985	-14 54 57.7	-83.75	22 54.3	21	18 7 14.65	+17.580	-25 10 40.4	- 6.95	0 11.4			
22	14 55 56.82	15.122	15 28 15.9	82.73	22 56.4	22	18 14 17.11	17.625	25 12 44.4	- 3.37	0 14.5			
23	15 2 1.30	15.250	16 1 7.2	81.52	22 58.6	23	18 21 20.59	17.664	25 13 21.7	+ 0.26	0 17.6			
24	15 8 8.71	15.367	16 33 27.2	80.12	23 0.8	24	18 28 24.95	17.698	25 12 31.3	3.94	0 20.7			
25	15 14 18.86	15.478	17 5 11.6	78.55	23 3.1	25	18 35 30.02	17.723	25 10 12.1	7.66	0 23.8			
26	15 20 31.60	+15.583	-17 36 16.8	-76.85	23 5.4	26	18 42 35.62	+17.742	-25 6 23.0	+11.43	0 27.0			
27	15 26 46.82	15.684	18 6 39.4	75.02	23 7.8	27	18 49 41.56	17.753	25 1 3.0	15.23	0 30.2			
28	15 33 4.42	15.782	18 36 16.7	73.07	23 10.2	28	18 56 47.63	17.753	24 54 11.3	19.07	0 33.3			
29	15 39 24.33	15.877	19 5 5.6	71.00	23 12.6	29	19 3 53.59	17.743	24 45 47.1	22.95	0 36.5			
30	15 45 46.49	15.970	19 33 3.7	68.84	23 15.0	30	19 10 59.17	17.721	24 35 49.6	26.85	0 39.7			
31	15 52 10.86	+16.060	-20 0 8.8	-66.58	23 17.5	31	19 18 4.10	+17.687	-24 24 18.4	+30.76	0 42.9			
32	15 58 37.39	+16.150	-20 26 18.6	-64.23	23 20.1	32	19 25 8.05	+17.640	-24 11 13.2	+34.68	0 46.0			
Day of the Month.						Day of the Month.								
	2d.	7th.	12th.	17th.	22d.	27th.		2d.	7th.	12th.	17th.	22d.	27th.	32d.
Semidiameter	3.89	3.36	2.99	2.73	2.56	2.45	Semidiameter . . .	2.38	3.33	2.30	2.30	2.33	2.30	2.47
Horizontal Parallax . . .	10.25	8.86	7.87	7.20	6.75	6.45	Horizontal Parallax	6.25	6.13	6.07	6.08	6.15	6.29	6.51

NOTE.—The sign + prefixed to the hourly change of declination indicates that south declinations are decreasing; the sign — indicates that north declinations are decreasing or south declinations increasing.

GREENWICH MEAN TIME.

JANUARY.						FEBRUARY.					
Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.	Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.
	Noon.	Noon.	Noon.	Noon.			Noon.	Noon.	Noon.	Noon.	
	h m s	s	° ' "	"	h m		h m s	s	° ' "	"	h m
1	15 57 56.26	+ 5.089	-16 8 29.3	- 7.40	21 16.1	1	17 38 19.81	+10.251	-19 30 21.8	-13.94	20 16.1
2	16 0 1.55	5.350	16 11 44.0	8.81	21 14.3	2	17 42 27.00	10.347	19 35 47.5	13.19	20 14.3
3	16 2 13.02	5.604	16 15 31.4	10.12	21 12.7	3	17 46 36.46	10.440	19 40 54.7	12.40	20 12.7
4	16 4 30.47	5.849	16 19 49.2	11.34	21 11.1	4	17 50 48.10	10.530	19 45 42.5	11.58	20 11.1
5	16 6 53.70	6.086	16 24 35.0	12.46	21 9.6	5	17 55 1.85	10.616	19 50 10.0	10.71	20 9.6
6	16 9 22.54	+ 6.316	-16 29 46.5	-13.49	21 8.2	6	17 59 17.63	+10.699	-19 54 16.2	- 9.80	20 8.2
7	16 11 56.80	6.538	16 35 21.5	14.42	21 6.9	7	18 3 35.36	10.778	19 58 0.2	8.86	20 6.9
8	16 14 36.30	6.753	16 41 17.8	15.26	21 5.7	8	18 7 54.95	10.854	20 1 21.3	7.89	20 5.7
9	16 17 20.86	6.960	16 47 33.2	16.01	21 4.6	9	18 12 16.31	10.926	20 4 18.8	6.89	20 4.6
10	16 20 10.31	7.160	16 54 5.7	16.68	21 3.5	10	18 16 39.36	10.995	20 6 51.8	5.85	20 3.5
11	16 23 4.48	+ 7.353	-17 0 53.2	-17.26	21 2.6	11	18 21 4.03	+11.061	-20 8 59.6	- 4.79	20 2.6
12	16 26 3.22	7.540	17 7 53.6	17.76	21 1.7	12	18 25 30.24	11.123	20 10 41.6	3.71	21 1.7
13	16 29 6.36	7.721	17 15 5.0	18.18	21 0.9	13	18 29 57.91	11.182	20 11 57.3	2.60	21 0.9
14	16 32 13.77	7.895	17 22 25.5	18.52	21 0.1	14	18 34 26.95	11.237	20 12 46.0	1.46	21 0.1
15	16 35 25.28	8.063	17 29 53.3	18.79	20 59.4	15	18 38 57.27	11.289	20 13 7.3	- 0.30	21 0.1
16	16 38 40.77	+ 8.226	-17 37 26.8	-18.99	20 58.8	16	18 43 28.81	+11.339	-20 13 0.6	+ 0.87	21 0.1
17	16 42 0.11	8.384	17 45 4.2	19.12	20 58.2	17	18 48 1.52	11.386	20 12 25.5	2.06	21 0.1
18	16 45 23.17	8.537	17 52 43.8	19.18	20 57.7	18	18 52 35.31	11.430	20 11 21.5	3.27	21 0.1
19	16 48 49.83	8.685	18 0 24.1	19.18	20 57.3	19	18 57 10.12	11.470	20 9 48.3	4.50	21 0.1
20	16 52 19.99	8.828	18 8 3.6	19.11	20 56.9	20	19 1 45.87	11.508	20 7 45.6	5.74	21 0.1
21	16 55 53.55	+ 8.967	-18 15 40.7	-18.97	20 56.6	21	19 6 22.50	+11.544	-20 5 13.0	+ 6.99	21 0.1
22	16 59 30.40	9.102	18 23 13.9	18.78	20 56.3	22	19 10 59.95	11.577	20 2 10.1	8.25	21 0.1
23	17 3 10.44	9.234	18 30 41.8	18.53	20 56.0	23	19 15 38.16	11.607	19 58 36.8	9.53	21 0.1
24	17 6 53.58	9.361	18 38 3.1	18.23	20 55.8	24	19 20 17.05	11.634	19 54 32.7	10.81	21 0.1
25	17 10 39.72	9.484	18 45 16.4	17.87	20 55.7	25	19 24 56.58	11.659	19 49 57.7	12.11	21 0.1
26	17 14 28.79	+ 9.604	-18 52 20.5	-17.46	20 55.6	26	19 29 36.68	+11.682	-19 44 51.5	+13.41	21 0.1
27	17 18 20.69	9.720	18 59 14.0	16.99	20 55.6	27	19 34 17.30	11.702	19 39 14.1	14.71	21 0.1
28	17 22 15.34	9.833	19 5 55.8	16.48	20 55.6	28	19 38 58.38	11.720	19 33 5.3	16.02	21 0.1
29	17 26 12.66	9.943	19 12 24.6	15.92	20 55.6	29	19 43 39.86	11.736	19 26 25.0	17.33	21 0.1
30	17 30 12.57	10.049	19 18 39.3	15.30	20 55.7	30	19 48 21.70	11.750	19 19 13.2	18.64	21 0.1
31	17 34 14.98	+10.152	-19 24 38.7	-14.64	20 55.8	31	19 53 3.84	+11.761	-19 11 29.8	+19.96	21 0.1
32	17 38 19.81	+10.251	-19 30 21.8	-13.94	20 56.0	32	19 57 46.22	+11.770	-19 3 14.9	+21.28	21 0.1
Day of Month.	1st.	6th.	11th.	16th.	21st.	26th.	31st.	Day of the Month.			
	"	"	"	"	"	"	"		"	"	"
Semidiameter	21.11	19.47	18.01	16.72	15.58	14.58	13.69	Semidiameter	12.90	12.20	11.56
Hor. Parallax	21.74	20.05	18.55	17.22	16.05	15.02	14.10	Horizontal Parallax	13.29	12.56	11.90

NOTE.—The sign + indicates north declinations; the sign - indicates south declinations.

GREENWICH MEAN TIME.

MARCH.						APRIL.					
Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.	Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.
Noon.	Noon.	Noon.	Noon.	Noon.		Noon.	Noon.	Noon.	Noon.		
h m s	s	" ' "	"	h m		h m s	s	" ' "	"	h m	
1 19 43 39.86	+11.736	-19 26 25.0	+17.33	21 11.5	1	22 8 18.92	+11.401	-11 54 11.3	+53.23	21 33.8	
2 19 48 21.70	11.750	19 19 13.2	18.64	21 12.2	2	22 12 52.29	11.380	11 32 43.2	54.10	21 34.4	
3 19 53 3.84	11.761	19 11 29.8	19.96	21 13.0	3	22 17 25.15	11.359	11 10 54.5	54.95	21 35.0	
4 19 57 46.22	11.770	19 3 14.9	21.28	21 13.8	4	22 21 57.50	11.337	10 48 45.9	55.77	21 35.6	
5 20 2 28.80	11.777	18 54 28.4	22.59	21 14.5	5	22 26 29.34	11.316	10 26 17.8	56.57	21 36.2	
6 20 7 11.52	+11.782	-18 45 10.4	+23.90	21 15.3	6	22 31 0.68	+11.295	-10 33 0.9	+57.34	21 36.8	
7 20 11 54.32	11.785	18 35 21.1	25.20	21 16.1	7	22 35 31.53	11.275	9 40 25.8	58.08	21 37.4	
8 20 16 37.16	11.785	18 25 0.5	26.50	21 16.8	8	22 40 1.90	11.255	9 17 3.2	58.80	21 37.9	
9 20 21 19.99	11.783	18 14 9.0	27.79	21 17.5	9	22 44 31.79	11.236	8 53 23.6	59.49	21 38.4	
10 20 26 2.76	11.780	18 2 46.6	29.07	21 18.3	10	22 49 1.22	11.217	8 29 27.8	60.15	21 39.0	
11 20 30 45.42	+11.775	-17 50 53.6	+30.34	21 19.2	11	22 53 30.19	+11.198	-8 5 16.3	+60.80	21 39.5	
12 20 35 27.93	11.768	17 38 30.3	31.60	21 20.0	12	22 57 58.72	11.180	7 40 49.8	61.41	21 40.0	
13 20 40 10.24	11.758	17 25 37.0	32.84	21 20.7	13	23 2 26.82	11.163	7 16 8.9	61.99	21 40.5	
14 20 44 52.31	11.747	17 12 14.0	34.07	21 21.4	14	23 6 54.52	11.146	6 51 14.3	62.55	21 41.1	
15 20 49 34.10	11.735	16 58 21.6	35.29	21 22.2	15	23 11 21.83	11.130	6 26 6.7	63.08	21 41.6	
16 20 54 15.58	+11.722	-16 44 0.1	+36.49	21 23.0	16	23 15 48.78	+11.115	-6 0 46.6	+63.59	21 42.1	
17 20 58 56.73	11.707	16 29 9.9	37.68	21 23.7	17	23 20 15.37	11.101	5 35 14.7	64.07	21 42.6	
18 21 3 37.51	11.691	16 13 51.5	38.85	21 24.4	18	23 24 41.63	11.088	5 9 31.7	64.52	21 43.1	
19 21 8 17.89	11.674	15 58 5.2	40.00	21 25.1	19	23 29 7.60	11.076	4 43 38.1	64.94	21 43.6	
20 21 12 57.84	11.656	15 41 51.5	41.13	21 25.8	20	23 33 33.28	11.065	4 17 34.7	65.34	21 44.1	
21 21 17 37.35	+11.637	-15 25 10.8	+42.25	21 26.6	21	23 37 58.71	+11.055	-3 51 22.0	+65.71	21 44.6	
22 21 22 16.40	11.617	15 8 3.5	43.35	21 27.3	22	23 42 23.91	11.046	3 25 0.7	66.06	21 45.0	
23 21 26 54.96	11.596	14 50 30.1	44.43	21 28.0	23	23 46 48.91	11.038	2 58 31.5	66.38	21 45.4	
24 21 31 33.03	11.576	14 32 30.9	45.49	21 28.7	24	23 51 13.74	11.032	2 31 54.9	66.67	21 45.9	
25 21 36 10.60	11.555	14 14 6.5	46.53	21 29.3	25	23 55 38.43	11.027	2 5 11.6	66.94	21 46.4	
26 21 40 47.65	+11.533	-13 55 17.4	+47.55	21 30.0	26	0 0 3.02	+11.023	-1 38 22.2	+67.18	21 46.8	
27 21 45 24.18	11.511	13 36 4.0	48.55	21 30.7	27	0 4 27.54	11.021	1 11 27.3	67.39	21 47.3	
28 21 50 0.18	11.489	13 16 26.9	49.53	21 31.4	28	0 8 52.02	11.020	0 44 27.5	67.58	21 47.8	
29 21 54 35.65	11.467	12 56 26.6	50.49	21 32.0	29	0 13 16.49	11.020	-0 17 23.5	67.75	21 48.3	
30 21 59 10.60	11.445	12 36 3.5	51.43	21 32.6	30	0 17 40.98	11.022	+0 9 44.1	67.88	21 48.7	
31 22 3 45.03	+11.423	-12 15 18.3	+52.34	21 33.2	31	0 22 5.54	+11.025	+0 36 54.7	+67.99	21 49.1	
32 22 8 18.92	+11.401	-11 54 11.3	+53.23	21 33.8	32	0 26 30.20	+11.030	+1 4 7.6	+68.07	21 49.6	
Day of the Month.						Day of the Month.					
2d. 7th. 12th. 17th. 22d. 27th.						1st. 6th. 11th. 16th. 21st. 26th.					
Semidiameter						Semidiameter					
Horizontal Parallax . . .						Horizontal Parallax . . .					

NOTE.—The sign + prefixed to the hourly change of declination indicates that north declinations are increasing or south declinations decreasing. The sign — indicates that south declinations are increasing.

GREENWICH MEAN TIME.

MAY.						JUNE.					
Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Merid- ian Pas- sage.	Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. De- cl. for Hour.	
	Noon.	Noon.	Noon.	Noon.			Noon.	Noon.	Noon.	Noon.	
	h m s	s	° ' "	"	h m		h m s	s	° ' "	"	
1	0 22 5.54	+11.025	+ 0 36 54.7	+67.99	21 49.1	1	2 42 9.92	+11.768	+14 2 37.9	+57	
2	0 26 30.20	11.030	1 4 7.6	68.07	21 49.6	2	2 46 52.87	11.811	14 25 26.2	56	
3	0 30 54.98	11.036	1 31 22.1	68.13	21 50.1	3	2 51 36.85	11.854	14 47 55.0	55	
4	0 35 19.92	11.043	1 58 37.7	68.16	21 50.6	4	2 56 21.88	11.898	15 10 3.5	54	
5	0 39 45.06	11.052	2 25 53.6	68.16	21 51.1	5	3 1 7.97	11.943	15 31 51.0	54	
6	0 44 10.43	+11.062	+ 2 53 9.1	+68.13	21 51.6	6	3 5 55.14	+11.988	+15 53 16.9	+53	
7	0 48 36.06	11.073	3 20 23.7	68.07	21 52.1	7	3 10 43.40	12.033	16 14 20.4	52	
8	0 53 1.97	11.086	3 47 36.6	67.99	21 52.6	8	3 15 32.75	12.079	16 35 0.8	51	
9	0 57 28.20	11.100	4 14 47.1	67.88	21 53.1	9	3 20 23.20	12.125	16 55 17.3	50	
10	1 1 54.78	11.115	4 41 54.5	67.74	21 53.6	10	3 25 14.76	12.171	17 15 9.3	49	
11	1 6 21.74	+11.132	+ 5 8 58.2	+67.57	21 54.1	11	3 30 7.43	+12.218	+17 34 36.1	+48	
12	1 10 49.11	11.150	5 35 57.4	67.37	21 54.6	12	3 35 1.22	12.264	17 53 37.1	46	
13	1 15 16.93	11.169	6 2 51.5	67.14	21 55.1	13	3 39 56.11	12.310	18 12 11.5	45	
14	1 19 45.22	11.189	6 29 39.8	66.88	21 55.6	14	3 44 52.11	12.356	18 30 18.6	44	
15	1 24 14.02	11.211	6 56 21.6	66.59	21 56.1	15	3 49 49.22	12.402	18 47 57.8	43	
16	1 28 43.35	+11.234	+ 7 22 56.2	+66.28	21 56.7	16	3 54 47.43	+12.448	+19 5 8.3	+42	
17	1 33 13.24	11.258	7 49 23.0	65.94	21 57.3	17	3 59 46.73	12.494	19 21 49.7	41	
18	1 37 43.73	11.283	8 15 41.2	65.57	21 57.9	18	4 4 47.12	12.539	19 38 1.2	39	
19	1 42 14.84	11.310	8 41 50.2	65.17	21 58.5	19	4 9 48.58	12.583	19 53 42.2	38	
20	1 46 46.61	11.338	9 7 49.2	64.74	21 59.1	20	4 14 51.09	12.627	20 8 52.1	37	
21	1 51 19.08	+11.368	+ 9 33 37.6	+64.29	21 59.7	21	4 19 54.64	+12.670	+20 23 30.3	+35	
22	1 55 52.27	11.399	9 59 14.8	63.81	22 0.3	22	4 24 59.22	12.712	20 37 36.2	34	
23	2 0 26.20	11.430	10 24 40.1	63.30	22 0.9	23	4 30 4.81	12.753	20 51 9.3	33	
24	2 5 0.90	11.462	10 49 52.8	62.76	22 1.6	24	4 35 11.39	12.794	21 4 8.9	31	
25	2 9 36.40	11.496	11 14 52.1	62.19	22 2.3	25	4 40 18.93	12.834	21 16 34.5	30	
26	2 14 12.74	+11.532	+11 39 37.5	+61.59	22 2.9	26	4 45 27.42	+12.873	+21 28 25.6	+28	
27	2 18 49.95	11.569	12 4 8.2	60.96	22 3.6	27	4 50 36.83	12.911	21 39 41.6	27	
28	2 23 28.05	11.607	12 28 23.6	60.31	22 4.3	28	4 55 47.13	12.947	21 50 22.1	25	
29	2 28 7.08	11.646	12 52 23.0	59.63	22 5.0	29	5 0 58.29	12.982	22 0 26.5	24	
30	2 32 47.05	11.685	13 16 5.6	58.92	22 5.8	30	5 6 10.28	13.016	22 9 54.4	22	
31	2 37 27.99	+11.726	+13 39 30.8	+58.18	22 6.6	31	5 11 23.07	+13.049	+22 18 45.4	+21	
32	2 42 9.92	+11.768	+14 2 37.9	+57.47	22 7.3	32	5 16 36.62	+13.080	+22 26 58.9	+19	
Day of the Month.						Day of the Month.					
1st. 6th. 11th. 16th. 21st. 26th. 31st.						5th. 10th. 15th. 20th.					
Semidiameter						Semidiameter					
Horizontal Parallax						Horizontal Parallax					

NOTE.—The sign + indicates north declinations.

GREENWICH MEAN TIME.

JULY.

AUGUST.

Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.	Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.
	Noon.	Noon.	Noon.	Noon.			Noon.	Noon.	Noon.	Noon.	
	h m s	s	° ' "	"	h m		h m s	s	° ' "	"	h m
1	5 11 23.07	+13.049	+22 18 45.4	+21.35	22 38.8	1	7 55 8.19	+13.022	+21 25 36.8	-29.92	23 20.2
2	5 16 36.62	13.080	22 26 58.9	19.78	22 40.1	2	8 0 20.34	12.990	21 13 19.9	31.48	23 21.5
3	5 21 50.88	13.108	22 34 34.6	18.19	22 41.4	3	8 5 31.71	12.957	21 0 25.9	33.02	23 22.8
4	5 27 5.81	13.135	22 41 32.0	16.59	22 42.7	4	8 10 42.27	12.922	20 46 55.2	34.54	23 24.0
5	5 32 21.37	13.161	22 47 50.9	14.98	22 44.0	5	8 15 51.97	12.886	20 32 48.3	36.03	23 25.2
6	5 37 37.52	+13.184	+22 53 30.9	+13.35	22 45.3	6	8 21 0.79	+12.849	+20 18 5.7	-37.51	23 26.4
7	5 42 54.20	13.205	22 58 31.6	11.70	22 46.7	7	8 26 8.71	12.811	20 2 47.9	38.97	23 27.6
8	5 48 11.35	13.223	23 2 52.6	10.05	22 48.1	8	8 31 15.71	12.772	19 46 55.4	40.40	23 28.7
9	5 53 28.92	13.240	23 6 33.9	8.39	22 49.4	9	8 36 21.75	12.732	19 30 28.8	41.81	23 29.8
10	5 58 46.88	13.255	23 9 35.2	6.72	22 50.7	10	8 41 26.82	12.691	19 13 28.6	43.20	23 31.0
11	6 4 5.17	+13.268	+23 11 56.3	+5.04	22 52.1	11	8 46 30.89	+12.649	+18 55 55.4	-44.56	23 32.1
12	6 9 23.72	13.278	23 13 36.9	3.35	22 53.5	12	8 51 33.96	12.606	18 37 49.9	45.90	23 33.2
13	6 14 42.49	13.286	23 14 37.0	+1.66	22 54.9	13	8 56 36.00	12.563	18 19 12.6	47.21	23 34.3
14	6 20 1.41	13.291	23 14 56.4	-0.04	22 56.3	14	9 1 37.01	12.520	18 0 4.2	48.49	23 35.4
15	6 25 20.44	13.294	23 14 35.1	1.74	22 57.6	15	9 6 36.98	12.477	17 40 25.2	49.75	23 36.4
16	6 30 39.51	+13.295	+23 13 33.0	-3.44	22 59.0	16	9 11 35.90	+12.433	+17 20 16.4	-50.98	23 37.4
17	6 35 58.57	13.293	23 11 50.0	5.14	23 0.4	17	9 16 33.77	12.389	16 59 38.4	52.18	23 38.4
18	6 41 17.56	13.289	23 9 26.2	6.84	23 1.8	18	9 21 30.60	12.345	16 38 31.8	53.36	23 39.4
19	6 46 36.43	13.283	23 6 21.7	8.54	23 3.1	19	9 26 26.37	12.302	16 16 57.3	54.51	23 40.4
20	6 51 55.13	13.275	23 2 36.5	10.23	23 4.4	20	9 31 21.09	12.259	15 54 55.6	55.63	23 41.3
21	6 57 13.60	+13.264	+22 58 10.6	-11.92	23 5.8	21	9 36 14.78	+12.216	+15 32 27.4	-56.72	23 42.2
22	7 2 31.79	13.252	22 53 4.2	13.60	23 7.2	22	9 41 7.44	12.173	15 9 33.3	57.78	23 43.2
23	7 7 49.66	13.237	22 47 17.5	15.28	23 8.5	23	9 45 59.08	12.131	14 46 14.0	58.82	23 44.1
24	7 13 7.15	13.220	22 40 50.6	16.96	23 9.8	24	9 50 49.72	12.090	14 22 30.1	59.83	23 45.0
25	7 18 24.21	13.201	22 33 43.6	18.62	23 11.2	25	9 55 39.38	12.049	13 58 22.4	60.81	23 45.9
26	7 23 40.80	+13.181	+22 25 56.9	-20.27	23 12.6	26	10 0 28.07	+12.009	+13 33 51.5	-61.76	23 46.7
27	7 28 56.89	13.159	22 17 30.7	21.91	23 13.9	27	10 5 15.81	11.970	13 8 58.2	62.68	23 47.5
28	7 34 12.42	13.135	22 8 25.2	23.54	23 15.2	28	10 10 2.62	11.932	12 43 43.1	63.57	23 48.4
29	7 39 27.36	13.110	21 58 40.7	25.16	23 16.5	29	10 14 48.52	11.894	12 18 7.0	64.43	23 49.2
30	7 44 41.66	13.082	21 48 17.6	26.76	23 17.8	30	10 19 33.53	11.857	11 52 10.5	65.26	23 50.0
31	7 49 55.28	+13.053	+21 37 16.2	-28.35	23 19.0	31	10 24 17.68	+11.822	+11 25 54.3	-66.07	23 50.8
32	7 55 8.19	+13.022	+21 25 36.8	-29.92	23 20.2	32	10 29 1.00	+11.788	+10 59 19.2	-66.85	23 51.5

Day of the Month.							Day of the Month.						
	5th.	10th.	15th.	20th.	25th.	30th.		4th.	9th.	14th.	19th.	24th.	29th.
Semidiameter	5.32	5.26	5.21	5.17	5.13	5.09	Semidiameter	5.06	5.03	5.00	4.98	4.97	4.96
Horizontal Parallax . . .	5.48	5.42	5.37	5.32	5.28	5.24	Horizontal Parallax . . .	5.21	5.18	5.15	5.13	5.12	5.11

NOTE.—The sign + prefixed to the hourly change of declination indicates that north declinations are increasing; the sign — indicates that north declinations are decreasing.

GREENWICH MEAN TIME.

SEPTEMBER.						OCTOBER.					
Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.	Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.
	Noon.	Noon.	Noon.	Noon.			Noon.	Noon.	Noon.	Noon.	
	h m s	s	° ' "	"	h m		h m s	s	° ' "	"	h m
1	10 29 1.00	+11.788	+10 59 19.2	-66.85	23 51.5	1	12 46 51.05	+11.426	-3 44 5.9	-75.82	0 10.3
2	10 33 43.50	11.754	10 32 25.9	67.59	23 52.2	2	12 51 25.43	11.440	4 14 23.4	75.64	0 10.9
3	10 38 25.22	11.722	10 5 15.2	68.30	23 53.0	3	12 56 0.18	11.456	4 44 36.3	75.43	0 11.5
4	10 43 6.18	11.691	9 37 47.7	68.98	23 53.7	4	13 0 35.34	11.474	5 14 43.9	75.19	0 12.2
5	10 47 46.42	11.662	9 10 4.2	69.63	23 54.4	5	13 5 10.95	11.494	5 44 45.4	74.92	0 12.9
6	10 52 25.96	+11.634	+8 42 5.5	-70.25	23 55.1	6	13 9 47.05	+11.515	-6 14 40.0	-74.62	0 13.5
7	10 57 4.83	11.607	8 13 52.2	70.84	23 55.8	7	13 14 23.68	11.538	6 44 27.0	74.29	0 14.2
8	11 1 43.07	11.581	7 45 25.1	71.40	23 56.5	8	13 19 0.87	11.562	7 14 5.5	73.92	0 14.9
9	11 6 20.71	11.556	7 16 45.0	71.93	23 57.2	9	13 23 38.67	11.588	7 43 34.9	73.52	0 15.6
10	11 10 57.77	11.533	6 47 52.6	72.43	23 57.9	10	13 28 17.12	11.616	8 12 54.3	73.09	0 16.3
11	11 15 34.30	+11.511	+6 18 48.6	-72.90	23 58.5	11	13 32 56.25	+11.645	-8 42 2.9	-72.62	0 17.0
12	11 20 10.32	11.491	5 49 33.8	73.33	23 59.1	12	13 37 36.09	11.675	9 10 59.9	72.12	0 17.7
13	11 24 45.88	11.472	5 20 9.0	73.73	23 59.8	13	13 42 16.67	11.707	9 39 44.5	71.59	0 18.4
14	11 29 21.00	11.455	4 50 34.9	74.10	...	14	13 46 58.04	11.741	10 8 15.9	71.03	0 19.2
15	11 33 55.73	11.439	4 20 52.2	74.45	0 0.5	15	13 51 40.23	11.776	10 36 33.4	70.43	0 20.0
16	11 38 30.10	+11.425	+3 51 1.6	-74.76	0 1.1	16	13 56 23.27	+11.812	-11 4 36.2	-69.80	0 20.7
17	11 43 4.15	11.413	3 21 3.9	75.04	0 1.7	17	14 1 7.20	11.849	11 32 23.5	69.14	0 21.5
18	11 47 37.92	11.402	2 50 59.8	75.29	0 2.3	18	14 5 52.04	11.888	11 59 54.5	68.44	0 22.3
19	11 52 11.46	11.393	2 20 50.1	75.51	0 2.9	19	14 10 37.83	11.928	12 27 8.4	67.71	0 23.1
20	11 56 44.80	11.385	1 50 35.5	75.70	0 3.6	20	14 15 24.61	11.970	12 54 4.5	66.95	0 24.0
21	12 1 17.98	+11.380	+1 20 16.6	-75.86	0 4.2	21	14 20 12.40	+12.013	-13 20 41.9	-66.16	0 24.9
22	12 5 51.05	11.377	0 49 54.2	76.00	0 4.8	22	14 25 1.23	12.057	13 46 59.9	65.34	0 25.7
23	12 10 24.07	11.375	+0 19 29.0	76.10	0 5.4	23	14 29 51.12	12.102	14 12 57.7	64.48	0 26.6
24	12 14 57.06	11.375	-0 10 58.3	76.17	0 6.0	24	14 34 42.12	12.148	14 38 34.5	63.58	0 27.5
25	12 19 30.08	11.377	0 41 26.9	76.21	0 6.6	25	14 39 34.24	12.195	15 3 49.4	62.65	0 28.4
26	12 24 3.16	+11.380	-1 11 56.1	-76.22	0 7.2	26	14 44 27.50	+12.243	-15 28 41.7	-61.70	0 29.4
27	12 28 36.34	11.385	1 42 25.2	76.20	0 7.8	27	14 49 21.93	12.292	15 53 10.7	60.71	0 30.4
28	12 33 9.68	11.393	2 12 53.5	76.15	0 8.5	28	14 54 17.55	12.342	16 17 15.4	59.68	0 31.3
29	12 37 43.22	11.402	2 43 20.2	76.07	0 9.1	29	14 59 14.37	12.392	16 40 55.1	58.62	0 32.3
30	12 42 16.99	11.413	3 13 44.6	75.96	0 9.7	30	15 4 12.40	12.443	17 4 9.1	57.53	0 33.3
31	12 46 51.05	+11.426	-3 44 5.9	-75.82	0 10.3	31	15 9 11.66	+12.495	-17 26 56.6	-56.41	0 34.4
32	12 51 25.43	+11.440	-4 14 23.4	-75.64	0 10.9	32	15 14 12.17	+12.547	-17 49 16.6	-55.25	0 35.5
Day of the Month.						Day of the Month.					
	3d.	8th.	13th.	18th.	23d.		3d.	8th.	13th.	18th.	23d.
Semidiameter	4.95	4.95	4.95	4.96	4.97	Semidiameter	4.99	5.01	5.04	5.07	5.10
Horizontal Parallax . . .	5.10	5.10	5.10	5.11	5.12	Horizontal Parallax . . .	5.14	5.16	5.19	5.22	5.25

NOTE.—The sign + indicates north declinations; the sign - indicates south declinations.

GREENWICH MEAN TIME.

NOVEMBER.						DECEMBER.					
Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.	Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.
	Noon.	Noon.	Noon.	Noon.			Noon.	Noon.	Noon.	Noon.	
	h m s	s	" ' "	"	h m		h m s	s	" ' "	"	h m
1	15 14 12.17	+12.547	-17 49 16.6	-55.25	0 35.5	1	17 52 59.92	+13.706	-24 27 47.2	-7.59	1 16.0
2	15 19 13.92	12.599	18 11 8.4	54.06	0 36.6	2	17 58 28.97	13.715	24 30 26.8	5.71	1 17.5
3	15 24 16.92	12.651	18 32 31.2	52.83	0 37.7	3	18 3 58.21	13.721	24 32 21.4	3.83	1 19.1
4	15 29 21.18	12.704	18 53 24.3	51.58	0 38.8	4	18 9 27.56	13.724	24 33 30.7	1.95	1 20.7
5	15 34 26.70	12.756	19 13 46.9	50.30	0 40.0	5	18 14 56.95	13.724	24 33 54.7	-0.06	1 22.2
6	15 39 33.47	+12.808	-19 33 38.2	-48.98	0 41.2	6	18 20 26.31	+13.722	-24 33 33.4	+1.83	1 23.7
7	15 44 41.48	12.859	19 52 57.4	47.62	0 42.3	7	18 25 55.57	13.717	24 32 26.8	3.72	1 25.3
8	15 49 50.72	12.910	20 11 43.7	46.23	0 43.5	8	18 31 24.67	13.708	24 30 34.9	5.61	1 26.9
9	15 55 1.17	12.960	20 29 56.4	44.82	0 44.7	9	18 36 53.52	13.696	24 27 57.7	7.49	1 28.4
10	16 0 12.83	13.010	20 47 34.9	43.38	0 46.0	10	18 42 22.06	13.682	24 24 35.5	9.36	1 29.9
11	16 5 25.67	+13.059	-21 4 38.3	-41.90	0 47.3	11	18 47 50.22	+13.664	-24 20 28.3	+11.23	1 31.4
12	16 10 39.66	13.107	21 21 6.0	40.40	0 48.6	12	18 53 17.93	13.644	24 15 36.4	13.09	1 32.9
13	16 15 54.79	13.154	21 36 57.3	38.87	0 49.9	13	18 58 45.12	13.621	24 9 59.9	14.95	1 34.5
14	16 21 11.03	13.199	21 52 11.6	37.31	0 51.2	14	19 4 11.73	13.595	24 3 39.0	16.79	1 36.0
15	16 26 28.35	13.244	22 6 48.1	35.73	0 52.6	15	19 9 37.69	13.567	23 56 34.1	18.62	1 37.5
16	16 31 46.72	+13.287	-22 20 46.3	-34.12	0 54.0	16	19 15 2.95	+13.537	-23 48 45.5	+20.43	1 39.0
17	16 37 6.11	13.328	22 34 5.6	32.49	0 55.3	17	19 20 27.46	13.504	23 40 13.6	22.23	1 40.4
18	16 42 26.47	13.368	22 46 45.4	30.83	0 56.7	18	19 25 51.15	13.469	23 30 58.7	24.01	1 41.8
19	16 47 47.77	13.407	22 58 45.1	29.15	0 58.1	19	19 31 13.96	13.432	23 21 1.2	25.77	1 43.3
20	16 53 9.98	13.444	23 10 4.3	27.45	0 59.5	20	19 36 35.86	13.393	23 10 21.5	27.52	1 44.7
21	16 58 33.05	+13.478	-23 20 42.3	-25.72	1 1.0	21	19 41 56.79	+13.351	-22 59 0.1	+29.25	1 46.1
22	17 3 56.93	13.511	23 30 38.7	23.98	1 2.5	22	19 47 16.71	13.308	22 46 57.5	30.96	1 47.5
23	17 9 21.58	13.542	23 39 53.1	22.22	1 3.9	23	19 52 35.57	13.263	22 34 14.1	32.65	1 48.9
24	17 14 46.94	13.571	23 48 25.0	20.44	1 5.4	24	19 57 53.33	13.216	22 20 50.5	34.31	1 50.3
25	17 20 12.97	13.598	23 56 13.9	18.64	1 6.9	25	20 3 9.95	13.168	22 6 47.3	35.95	1 51.6
26	17 25 39.61	+13.622	-24 3 19.5	-16.83	1 8.4	26	20 8 25.41	+13.119	-21 52 5.0	+37.57	1 52.9
27	17 31 6.80	13.644	24 9 41.6	15.00	1 9.9	27	20 13 39.67	13.069	21 36 44.2	39.16	1 54.2
28	17 36 34.49	13.663	24 15 19.7	13.16	1 11.4	28	20 18 52.70	13.017	21 20 45.5	40.72	1 55.5
29	17 42 2.61	13.680	24 20 13.4	11.31	1 13.0	29	20 24 4.48	12.964	21 4 9.5	42.26	1 56.7
30	17 47 31.11	13.694	24 24 22.7	9.46	1 14.5	30	20 29 14.98	12.910	20 46 57.0	43.77	1 57.9
31	17 52 59.92	+13.706	-24 27 47.2	-7.59	1 16.0	31	20 34 24.17	+12.855	-20 29 8.5	+4.26	1 59.2
32	17 58 28.97	+13.715	-24 30 26.8	-5.71	1 17.5	32	20 39 32.04	+12.800	-20 10 44.7	+46.71	2 0.4
Day of the Month.						Day of the Month.					
	2d.	7th.	12th.	17th.	22d.		2d.	7th.	12th.	17th.	22d.
Semidiameter	5.16	5.20	5.24	5.29	5.34	Semidiameter	5.46	5.52	5.59	5.66	5.74
Horizontal Parallax	5.32	5.36	5.40	5.45	5.50	Horizontal Parallax	5.62	5.69	5.76	5.83	5.91
	5.36				5.56						6.00
											6.10

NOTE.—The sign + prefixed to the hourly change of declination indicates that south declinations are decreasing; the sign — indicates that north declinations are decreasing or south declinations increasing.

GREENWICH MEAN TIME.

JANUARY.						FEBRUARY.					
Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.	Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.
	Noon.	Noon.	Noon.	Noon.			Noon.	Noon.	Noon.	Noon.	
	h m s	s	° ' "	"	h m		h m s	s	° ' "	"	h m
1	18 34 20.70	+8.328	-24 1 46.2	+ 5.68	23 53.5	1	20 16 56.49	+8.130	-20 45 43.1	+25.43	23 33.8
2	18 37 40.60	8.330	23 59 22.0	6.35	23 52.9	2	20 20 11.45	8.116	20 35 25.8	26.00	23 33.1
3	18 41 0.56	8.332	23 56 41.6	7.02	23 52.3	3	20 23 26.07	8.102	20 24 54.8	26.57	23 32.4
4	18 44 20.54	8.333	23 53 45.2	7.69	23 51.7	4	20 26 40.36	8.088	20 14 10.3	27.15	23 31.7
5	18 47 40.55	8.334	23 50 32.7	8.35	23 51.1	5	20 29 54.30	8.073	20 3 12.4	27.69	23 31.0
6	18 51 0.58	+8.334	-23 47 4.3	+ 9.02	23 50.5	6	20 33 7.89	+8.059	-19 52 1.3	+28.24	23 30.3
7	18 54 20.60	8.334	23 43 19.8	9.69	23 49.9	7	20 36 21.13	8.044	19 40 37.1	28.78	23 29.5
8	18 57 40.61	8.333	23 39 19.3	10.35	23 49.3	8	20 39 34.00	8.029	19 29 0.0	29.31	23 28.8
9	19 1 0.59	8.331	23 35 2.8	11.02	23 48.6	9	20 42 46.50	8.013	19 17 10.2	29.84	23 28.1
10	19 4 20.52	8.329	23 30 30.3	11.69	23 48.0	10	20 45 58.62	7.997	19 5 7.8	30.36	23 27.3
11	19 7 40.38	+8.326	-23 25 41.9	+12.35	23 47.4	11	20 49 10.36	+7.981	-18 52 52.9	+30.87	23 26.6
12	19 11 0.17	8.322	23 20 37.7	13.00	23 46.8	12	20 52 21.71	7.965	18 40 25.8	31.38	23 25.8
13	19 14 19.85	8.317	23 15 17.6	13.66	23 46.2	13	20 55 32.66	7.948	18 27 46.7	31.88	23 25.0
14	19 17 39.41	8.312	23 9 41.8	14.31	23 45.6	14	20 58 43.22	7.931	18 14 55.7	32.37	23 24.3
15	19 20 58.85	8.307	23 3 50.3	14.96	23 44.9	15	21 1 53.37	7.914	18 1 52.9	32.85	23 23.5
16	19 24 18.14	+8.301	-22 57 43.2	+15.62	23 44.3	16	21 5 3.11	+7.897	-17 48 38.7	+33.32	23 22.7
17	19 27 37.28	8.294	22 51 20.6	16.27	23 43.7	17	21 8 12.44	7.880	17 35 13.3	33.79	23 21.9
18	19 30 56.25	8.286	22 44 42.5	16.91	23 43.1	18	21 11 21.35	7.863	17 21 36.7	34.25	23 21.1
19	19 34 15.03	8.278	22 37 49.1	17.55	23 42.4	19	21 14 29.84	7.845	17 7 49.2	34.70	23 20.3
20	19 37 33.61	8.269	22 30 40.4	18.18	23 41.8	20	21 17 37.91	7.827	16 53 51.0	35.15	23 19.5
21	19 40 51.96	+8.260	-22 23 16.5	+18.81	23 41.2	21	21 20 45.55	+7.810	-16 39 42.2	+35.58	23 18.7
22	19 44 10.09	8.250	22 15 37.5	19.44	23 40.5	22	21 23 52.77	7.792	16 25 23.0	36.01	23 17.8
23	19 47 27.97	8.240	22 7 43.6	20.06	23 39.9	23	21 26 59.56	7.774	16 10 53.6	36.43	23 17.0
24	19 50 45.61	8.229	21 59 34.9	20.68	23 39.2	24	21 30 5.94	7.757	15 56 14.3	36.84	23 16.2
25	19 54 2.98	8.218	21 51 11.3	21.29	23 38.6	25	21 33 11.89	7.739	15 41 25.3	37.24	23 15.3
26	19 57 20.09	+8.207	-21 42 33.1	+21.90	23 37.9	26	21 36 17.42	+7.722	-15 26 26.6	+37.64	23 14.5
27	20 0 36.92	8.195	21 33 40.4	22.50	23 37.2	27	21 39 22.53	7.704	15 11 18.5	38.03	23 13.6
28	20 3 53.45	8.183	21 24 33.2	23.10	23 36.6	28	21 42 27.22	7.687	14 56 1.1	38.41	23 12.7
29	20 7 9.68	8.170	21 15 11.8	23.69	23 35.9	29	21 45 31.51	7.670	14 40 34.7	38.78	23 11.8
30	20 10 25.60	8.157	21 5 36.2	24.27	23 35.2	30	21 48 35.40	7.654	14 24 59.5	39.15	23 11.0
31	20 13 41.21	+8.144	-20 55 46.6	+24.85	23 34.5	31	21 51 38.88	+7.637	-14 9 15.6	+39.50	23 10.1
32	20 16 56.49	+8.130	-20 45 43.1	+25.43	23 33.8	32	21 54 41.95	+7.620	-13 53 23.3	+39.85	23 9.2
Day of the Month.						Day of the Month.					
o 5th. 10th. 15th. 20th. 25th. 30th.						4th. 9th. 14th. 19th. 24th.					
Semidiameter						Semidiameter					
Horizontal Parallax						Horizontal Parallax					

NOTE.—The sign + indicates north declinations; the sign - indicates south declinations.

GREENWICH MEAN TIME.

MARCH.

APRIL.

Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.	Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.
	Noon.	Noon.	Noon.	Noon.			Noon.	Noon.	Noon.	Noon.	
1	h m s	s	" ' "	"	h m	1	h m s	s	" ' "	"	h m
1	21 45 31.51	+7.670	-14 40 34.7	+38.78	23 11.8	1	23 17 41.16	+7.228	-5 45 26.6	+46.16	22 41.7
2	21 48 35.40	7.654	14 24 59.5	39.15	23 11.0	2	23 20 34.49	7.218	5 26 57.5	46.26	22 40.6
3	21 51 38.88	7.637	14 9 15.6	39.50	23 10.1	3	23 23 27.59	7.208	5 8 26.0	46.36	22 39.5
4	21 54 41.95	7.620	13 53 23.3	39.85	23 9.2	4	23 26 20.47	7.199	4 49 52.2	46.45	22 38.5
5	21 57 44.63	7.603	13 37 22.7	40.19	23 8.3	5	23 29 13.13	7.190	4 31 16.4	46.53	22 37.4
6	22 0 46.91	+7.587	-13 21 14.0	+40.53	23 7.4	6	23 32 5.57	+7.181	-4 12 38.8	+46.60	22 36.3
7	22 3 48.81	7.571	13 4 57.3	40.86	23 6.4	7	23 34 57.81	7.173	3 53 59.5	46.67	22 35.2
8	22 6 50.32	7.555	12 48 32.9	41.17	23 5.5	8	23 37 49.86	7.165	3 35 18.7	46.72	22 34.2
9	22 9 51.46	7.539	12 32 1.0	41.48	23 4.6	9	23 40 41.72	7.157	3 16 36.7	46.77	22 33.1
10	22 12 52.22	7.524	12 15 21.8	41.78	23 3.6	10	23 43 33.39	7.149	2 57 53.7	46.81	22 32.0
11	22 15 52.60	+7.508	-11 58 35.6	+42.07	23 2.7	11	23 46 24.89	+7.142	-2 39 9.8	+46.84	22 30.9
12	22 18 52.61	7.493	11 41 42.6	42.35	23 1.8	12	23 49 16.21	7.135	2 20 25.3	46.86	22 29.8
13	22 21 52.25	7.477	11 24 42.9	42.62	23 0.8	13	23 52 7.36	7.128	2 1 40.4	46.88	22 28.7
14	22 24 51.52	7.462	11 7 36.7	42.88	22 59.9	14	23 54 58.36	7.122	1 42 55.3	46.88	22 27.7
15	22 27 50.43	7.447	10 50 24.3	43.14	22 58.9	15	23 57 49.20	7.115	1 24 10.1	46.88	22 26.6
16	22 30 48.97	+7.432	-10 33 6.0	+43.38	22 57.9	16	0 0 39.90	+7.109	-1 5 25.1	+46.87	22 25.5
17	22 33 47.16	7.417	10 15 41.9	43.62	22 56.9	17	0 3 30.46	7.104	0 46 40.5	46.85	22 24.4
18	22 36 45.00	7.403	9 58 12.2	43.85	22 56.0	18	0 6 20.89	7.098	0 27 56.5	46.82	22 23.2
19	22 39 42.49	7.388	9 40 37.1	44.07	22 55.0	19	0 9 11.19	7.093	-0 9 13.2	46.78	22 22.1
20	22 42 39.64	7.374	9 22 56.9	44.28	22 54.0	20	0 12 1.36	7.088	+0 9 29.2	46.74	22 21.0
21	22 45 36.46	+7.361	-9 5 11.8	+44.48	22 53.0	21	0 14 51.42	+7.084	+0 28 10.4	+46.69	22 19.9
22	22 48 32.95	7.347	8 47 22.0	44.67	22 52.0	22	0 17 41.38	7.080	0 46 50.3	46.63	22 18.8
23	22 51 29.11	7.334	8 29 27.6	44.85	22 51.0	23	0 20 31.24	7.076	1 5 28.8	46.57	22 17.7
24	22 54 24.96	7.321	8 11 28.9	45.03	22 49.9	24	0 23 21.02	7.072	1 24 5.6	46.49	22 16.6
25	22 57 20.49	7.308	7 53 26.0	45.20	22 48.9	25	0 26 10.72	7.069	1 42 40.5	46.41	22 15.5
26	23 0 15.72	+7.295	-7 35 19.2	+45.36	22 47.9	26	0 29 0.34	+7.066	+2 1 13.4	+46.33	22 14.4
27	23 3 10.65	7.283	7 17 8.7	45.51	22 46.9	27	0 31 49.90	7.064	2 19 44.2	46.23	22 13.2
28	23 6 5.29	7.271	6 58 54.6	45.65	22 45.8	28	0 34 39.40	7.062	2 38 12.6	46.13	22 12.1
29	23 8 59.65	7.259	6 40 37.2	45.79	22 44.8	29	0 37 28.86	7.060	2 56 38.5	46.03	22 11.0
30	23 11 53.74	7.248	6 22 16.6	45.92	22 43.7	30	0 40 18.29	7.059	3 15 1.8	45.91	22 9.9
31	23 14 47.57	+7.238	-6 3 53.0	+46.04	22 42.7	31	0 43 7.70	+7.058	+3 33 22.3	+45.79	22 8.8
32	23 17 41.16	+7.228	-5 45 26.6	+46.16	22 41.7	32	0 45 57.09	+7.057	+3 51 39.9	+45.67	22 7.6
Day of the Month.						Day of the Month.					
1st. 6th. 11th. 16th. 21st. 26th. 31st.						5th. 10th. 15th. 20th. 25th. 30th.					
Semidiameter						Semidiameter					
Horizontal Parallax						Horizontal Parallax					

NOTE.—The sign + prefixed to the hourly change of declination indicates that north declinations are increasing or south declinations decreasing.

GREENWICH MEAN TIME.

MAY.						JUNE.							
Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.	Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.		
	Noon.	Noon.	Noon.	Noon.			Noon.	Noon.	Noon.	Noon.			
	h m s	s	° ' "	"	h m		h m s	s	° ' "	"	h m		
1	0 43 7.70	+7.058	+ 3 33 22.3	+45.79	22 8.8	1	2 10 58.00	+7.141	+12 23 7.4	+38.59	21 34.4		
2	0 45 57.09	7.057	3 51 39.9	45.67	22 7.6	2	2 13 49.46	7.147	12 38 29.7	38.26	21 33.4		
3	0 48 46.47	7.056	4 9 54.3	45.53	22 6.5	3	2 16 41.06	7.153	12 53 44.0	37.92	21 32.3		
4	0 51 35.84	7.056	4 28 5.4	45.39	22 5.4	4	2 19 32.81	7.159	13 8 50.2	37.58	21 31.2		
5	0 54 25.22	7.057	4 46 12.9	45.24	22 4.3	5	2 22 24.70	7.165	13 23 48.1	37.24	21 30.1		
6	0 57 14.61	+7.058	+ 5 4 16.7	+45.08	22 3.2	6	2 25 16.74	+7.171	+13 38 37.5	+36.88	21 29.0		
7	1 0 4.01	7.059	5 22 16.6	44.91	22 2.1	7	2 28 8.92	7.177	13 53 18.4	36.52	21 28.0		
8	1 2 53.44	7.060	5 40 12.6	44.74	22 0.9	8	2 31 1.24	7.183	14 7 50.6	36.15	21 26.9		
9	1 5 42.90	7.061	5 58 4.3	44.56	21 59.8	9	2 33 53.70	7.189	14 22 13.9	35.78	21 25.8		
10	1 8 32.39	7.062	6 15 51.6	44.38	21 58.7	10	2 36 46.31	7.195	14 36 28.2	35.40	21 24.8		
11	1 11 21.91	+7.064	+ 6 33 34.4	+44.19	21 57.6	11	2 39 39.06	+7.201	+14 50 33.4	+35.02	21 23.7		
12	1 14 11.47	7.066	6 51 12.4	43.98	21 56.5	12	2 42 31.95	7.206	15 4 29.3	34.64	21 22.7		
13	1 17 1.07	7.068	7 8 45.5	43.77	21 55.3	13	2 45 24.97	7.212	15 18 15.9	34.24	21 21.6		
14	1 19 50.73	7.070	7 26 13.5	43.56	21 54.2	14	2 48 18.12	7.218	15 31 53.0	33.84	21 20.5		
15	1 22 40.44	7.073	7 43 36.2	43.33	21 53.1	15	2 51 11.41	7.223	15 45 20.4	33.44	21 19.5		
16	1 25 30.21	+7.075	+ 8 0 53.5	+43.10	21 52.0	16	2 54 4.84	+7.229	+15 58 38.2	+33.04	21 18.5		
17	1 28 20.04	7.078	8 18 5.2	42.87	21 50.9	17	2 56 58.41	7.234	16 11 46.2	32.63	21 17.4		
18	1 31 9.93	7.080	8 35 11.1	42.62	21 49.8	18	2 59 52.10	7.239	16 24 44.2	32.21	21 16.4		
19	1 33 59.89	7.083	8 52 11.1	42.37	21 48.7	19	3 2 45.91	7.244	16 37 32.1	31.79	21 15.3		
20	1 36 49.92	7.086	9 9 5.1	42.12	21 47.6	20	3 5 39.85	7.249	16 50 9.9	31.36	21 14.3		
21	1 39 40.03	+7.090	+ 9 25 52.8	+41.86	21 46.5	21	3 8 33.90	+7.255	+17 2 37.5	+30.93	21 13.2		
22	1 42 30.23	7.093	9 42 34.2	41.59	21 45.4	22	3 11 28.08	7.260	17 14 54.7	30.50	21 12.2		
23	1 45 20.52	7.097	9 59 9.1	41.31	21 44.3	23	3 14 22.38	7.265	17 27 1.4	30.06	21 11.2		
24	1 48 10.90	7.101	10 15 37.3	41.03	21 43.2	24	3 17 16.82	7.271	17 38 57.7	29.62	21 10.1		
25	1 51 1.38	7.105	10 31 58.7	40.75	21 42.1	25	3 20 11.38	7.276	17 50 43.5	29.18	21 9.1		
26	1 53 51.96	+7.110	+10 48 13.2	+40.46	21 41.0	26	3 23 6.06	+7.281	+18 2 18.5	+28.74	21 8.1		
27	1 56 42.66	7.115	11 4 20.6	40.16	21 39.9	27	3 26 0.85	7.286	18 13 42.8	28.29	21 7.1		
28	1 59 33.47	7.120	11 20 20.9	39.86	21 38.8	28	3 28 55.76	7.291	18 24 56.3	27.83	21 6.0		
29	2 2 24.41	7.126	11 36 13.8	39.55	21 37.7	29	3 31 50.79	7.295	18 35 58.9	27.38	21 5.0		
30	2 5 15.48	7.131	11 51 59.3	39.24	21 36.6	30	3 34 45.94	7.300	18 46 50.4	26.92	21 4.0		
31	2 8 6.67	+7.136	+12 7 37.2	+38.92	21 35.5	31	3 37 41.21	+7.305	+18 57 30.8	+26.45	21 3.0		
32	2 10 58.00	+7.141	+12 23 7.4	+38.59	21 34.4	32	3 40 36.58	+7.309	+19 8 0.1	+25.98	21 2.0		
Day of the Month.						Day of the Month.							
	5th.	10th.	15th.	20th.	25th.	30th.		4th.	9th.	14th.	19th.	24th.	29th.
Semidiameter	3.32	3.34	3.35	3.36	3.38	3.39	Semidiameter	3.41	3.42	3.44	3.46	3.48	3.50
Horizontal Parallax . . .	4.05	4.07	4.09	4.12	4.14	4.17	Horizontal Parallax . . .	4.20	4.22	4.25	4.28	4.32	4.35

NOTE.—The sign + indicates north declinations.

GREENWICH MEAN TIME.

JULY.						AUGUST.					
Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.	Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.
	Noon.	Noon.	Noon.	Noon.			Noon.	Noon.	Noon.	Noon.	
	h m s	s	" "	"	h m		h m s	s	" "	"	h m
1	3 37 41.21	+7.305	+18 57 30.8	+26.45	21 3.0	1	5 8 28.72	+7.285	+22 51 17.1	+11.05	20 31.5
2	3 40 36.58	7.309	19 8 0.1	25.98	21 2.0	2	5 11 23.50	7.279	22 55 36.3	10.54	20 30.5
3	3 43 32.04	7.313	19 18 18.1	25.51	21 0.9	3	5 14 18.12	7.272	22 59 43.3	10.04	20 29.5
4	3 46 27.60	7.317	19 28 24.8	25.04	20 59.9	4	5 17 12.57	7.265	23 3 38.2	9.54	20 28.4
5	3 49 23.25	7.320	19 38 20.1	24.56	20 58.9	5	5 20 6.83	7.257	23 7 21.0	9.03	20 27.4
6	3 52 18.98	+7.323	+19 48 3.9	+24.08	20 57.9	6	5 23 0.90	+7.249	+23 10 51.8	+ 8.53	20 26.4
7	3 55 14.77	7.326	19 57 36.1	23.60	20 56.9	7	5 25 54.76	7.240	23 14 10.6	8.03	20 25.3
8	3 58 10.62	7.329	20 6 56.6	23.11	20 55.9	8	5 28 48.40	7.230	23 17 17.4	7.53	20 24.3
9	4 1 6.53	7.331	20 16 5.5	22.62	20 54.9	9	5 31 41.80	7.220	23 20 12.2	7.04	20 23.2
10	4 4 2.49	7.332	20 25 2.7	22.13	20 53.9	10	5 34 34.95	7.209	23 22 55.1	6.54	20 22.2
11	4 6 58.49	+7.334	+20 33 48.0	+21.64	20 52.8	11	5 37 27.84	+7.198	+23 25 26.2	+ 6.05	20 21.1
12	4 9 54.53	7.336	20 42 21.5	21.14	20 51.8	12	5 40 20.45	7.186	23 27 45.5	5.56	20 20.0
13	4 12 50.59	7.337	20 50 43.1	20.65	20 50.8	13	5 43 12.78	7.174	23 29 53.1	5.07	20 18.9
14	4 15 46.66	7.337	20 58 52.7	20.15	20 49.8	14	5 46 4.80	7.161	23 31 49.0	4.59	20 17.9
15	4 18 42.73	7.336	21 6 50.4	19.65	20 48.8	15	5 48 56.51	7.148	23 33 33.3	4.11	20 16.8
16	4 21 38.79	+7.336	+21 14 36.0	+19.15	20 47.8	16	5 51 47.89	+7.134	+23 35 6.0	+ 3.63	20 15.7
17	4 24 34.84	7.335	21 22 9.5	18.65	20 46.8	17	5 54 38.94	7.120	23 36 27.3	3.15	20 14.6
18	4 27 30.87	7.334	21 29 31.0	18.14	20 45.8	18	5 57 29.65	7.106	23 37 37.2	2.68	20 13.5
19	4 30 26.86	7.332	21 36 40.4	17.64	20 44.8	19	6 0 20.01	7.091	23 38 35.8	2.21	20 12.4
20	4 33 22.81	7.330	21 43 37.7	17.14	20 43.8	20	6 3 10.01	7.076	23 39 23.1	1.74	20 11.3
21	4 36 18.72	+7.328	+21 50 22.9	+16.63	20 42.8	21	6 5 59.64	+7.060	+23 39 59.3	+ 1.28	20 10.2
22	4 39 14.58	7.326	21 56 55.9	16.12	20 41.8	22	6 8 48.90	7.044	23 40 24.4	0.82	20 9.0
23	4 42 10.38	7.324	22 3 16.8	15.62	20 40.7	23	6 11 37.77	7.028	23 40 38.5	+ 0.36	20 7.9
24	4 45 6.12	7.321	22 9 25.5	15.11	20 39.7	24	6 14 26.24	7.011	23 40 41.7	- 0.09	20 6.8
25	4 48 1.78	7.318	22 15 22.0	14.60	20 38.7	25	6 17 14.32	6.995	23 40 34.1	0.54	20 5.6
26	4 50 57.36	+7.315	+22 21 6.3	+14.10	20 37.7	26	6 20 1.99	+6.978	+23 40 15.8	- 0.99	20 4.5
27	4 53 52.85	7.311	22 26 38.5	13.59	20 36.7	27	6 22 49.24	6.961	23 39 46.8	1.43	20 3.3
28	4 56 48.25	7.307	22 31 58.6	13.08	20 35.6	28	6 25 36.06	6.943	23 39 7.2	1.87	20 2.1
29	4 59 43.54	7.302	22 37 6.5	12.58	20 34.6	29	6 28 22.44	6.923	23 38 17.1	2.31	20 0.9
30	5 2 38.73	7.297	22 42 2.2	12.07	20 33.6	30	6 31 8.36	6.903	23 37 16.6	2.74	19 59.8
31	5 5 33.79	+7.291	+22 46 45.7	+11.56	20 32.6	31	6 33 53.80	+6.883	+23 36 5.8	- 3.16	19 58.6
32	5 8 28.72	+7.285	+22 51 17.1	+11.05	20 31.5	32	6 36 38.76	+6.863	+23 34 44.9	- 3.58	19 57.4
Day of the Month.						Day of the Month.					
4th. 9th. 14th. 19th. 24th. 29th.						3d. 8th. 13th. 18th. 23d. 28th.					
Semidiameter						Semidiameter					
Horizontal Parallax						Horizontal Parallax					

NOTE.—The sign + prefixed to the hourly change of declination indicates that north declinations are increasing; the sign - indicates that north declinations are decreasing.

GREENWICH MEAN TIME.

SEPTEMBER.						OCTOBER.					
Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.	Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.
	Noon.	Noon.	Noon.	Noon.			Noon.	Noon.	Noon.	Noon.	
	h m s	s	° ' "	"	h m		h m s	s	° ' "	"	h m
1	6 36 38.76	+6.863	+23 34 44.9	-3.58	19 57.4	1	7 54 30.94	+6.060	+21 46 45.9	-13.50	19 16.7
2	6 39 23.23	6.843	23 33 14.1	3.99	19 56.2	2	7 56 55.99	6.028	21 41 19.1	13.73	19 15.2
3	6 42 7.21	6.822	23 31 33.3	4.40	19 55.0	3	7 59 20.26	5.995	21 35 46.9	13.95	19 13.7
4	6 44 50.67	6.800	23 29 42.8	4.81	19 53.7	4	8 1 43.73	5.961	21 30 9.5	14.16	19 12.1
5	6 47 33.61	6.778	23 27 42.6	5.21	19 52.5	5	8 4 6.40	5.927	21 24 27.1	14.37	19 10.5
6	6 50 16.01	+6.755	+23 25 32.8	-5.60	19 51.3	6	8 6 28.25	+5.893	+21 18 39.9	-14.56	19 8.9
7	6 52 57.85	6.732	23 23 13.6	5.99	19 50.0	7	8 8 40.26	5.858	21 12 48.2	14.75	19 7.3
8	6 55 39.12	6.708	23 20 45.2	6.37	19 48.7	8	8 11 9.42	5.822	21 6 52.0	14.93	19 5.7
9	6 58 19.81	6.683	23 18 7.6	6.75	19 47.5	9	8 13 28.73	5.787	21 0 51.6	15.10	19 4.1
10	7 0 59.90	6.658	23 15 21.1	7.12	19 46.2	10	8 15 47.17	5.750	20 54 47.2	15.26	19 2.4
11	7 3 39.40	+6.633	+23 12 25.7	-7.49	19 44.9	11	8 18 4.73	+5.713	+20 48 39.0	-15.42	19 0.8
12	7 6 18.29	6.608	23 9 21.6	7.85	19 43.6	12	8 20 21.41	5.677	20 42 27.1	15.57	18 59.1
13	7 8 56.56	6.582	23 6 9.0	8.20	19 42.3	13	8 22 37.20	5.640	20 36 11.8	15.71	18 57.4
14	7 11 34.20	6.555	23 2 48.0	8.55	19 41.0	14	8 24 52.09	5.602	20 29 53.2	15.84	18 55.7
15	7 14 11.20	6.528	22 59 18.7	8.89	19 39.6	15	8 27 6.07	5.564	20 23 31.6	15.96	18 54.0
16	7 16 47.56	+6.501	+22 55 41.3	-9.23	19 38.3	16	8 29 19.14	+5.525	+20 17 7.2	-16.07	18 52.3
17	7 19 23.26	6.474	22 51 55.9	9.56	19 36.9	17	8 31 31.30	5.487	20 10 40.0	16.18	18 50.5
18	7 21 58.31	6.447	22 48 2.6	9.88	19 35.6	18	8 33 42.53	5.448	20 4 10.3	16.28	18 48.8
19	7 24 32.70	6.419	22 44 1.7	10.20	19 34.2	19	8 35 52.83	5.410	19 57 38.3	16.38	18 47.0
20	7 27 6.41	6.390	22 39 53.3	10.51	19 32.8	20	8 38 2.18	5.370	19 51 4.1	16.46	18 45.2
21	7 29 39.45	+6.362	+22 35 37.4	-10.81	19 31.4	21	8 40 10.59	+5.330	+19 44 28.0	-16.54	18 43.4
22	7 32 11.80	6.334	22 31 14.3	11.11	19 30.0	22	8 42 18.04	5.290	19 37 50.2	16.61	18 41.5
23	7 34 43.46	6.305	22 26 44.1	11.40	19 28.6	23	8 44 24.52	5.250	19 31 10.9	16.67	18 39.7
24	7 37 14.43	6.276	22 22 6.9	11.69	19 27.1	24	8 46 30.02	5.209	19 24 30.2	16.72	18 37.8
25	7 39 44.69	6.246	22 17 22.9	11.97	19 25.7	25	8 48 34.54	5.167	19 17 48.4	16.76	18 35.9
26	7 42 14.24	+6.216	+22 12 32.2	-12.24	19 24.2	26	8 50 38.05	+5.125	+19 11 5.7	-16.79	18 34.0
27	7 44 43.07	6.186	22 7 35.1	12.51	19 22.7	27	8 52 40.55	5.082	19 4 22.3	16.82	18 32.1
28	7 47 11.17	6.155	22 2 31.8	12.77	19 21.3	28	8 54 42.02	5.040	18 57 38.5	16.83	18 30.2
29	7 49 38.52	6.124	21 57 22.4	13.02	19 19.8	29	8 56 42.45	4.996	18 50 54.5	16.83	18 28.3
30	7 52 5.11	6.092	21 52 7.0	13.26	19 18.3	30	8 58 41.82	4.951	18 44 10.5	16.83	18 26.3
31	7 54 30.94	+6.060	+21 46 45.9	-13.50	19 16.7	31	9 0 40.12	+4.906	+18 37 26.8	-16.81	18 24.3
32	7 56 55.99	+6.028	+21 41 19.1	-13.73	19 15.2	32	9 2 37.32	+4.860	+18 30 43.6	-16.78	18 22.3
Day of the Month.						Day of the Month.					
	2d.	7th.	12th.	17th.	22d.		2d.	7th.	12th.	17th.	22d.
Semidiameter	2.91	2.96	3.01	3.07	3.13	Semidiameter	3.37	3.35	3.43	3.53	3.62
Horizontal Parallax . . .	5.07	5.16	5.25	5.35	5.46	Horizontal Parallax . . .	5.70	5.83	5.97	6.13	6.30

NOTE.—The sign + indicates north declinations.

GREENWICH MEAN TIME.

NOVEMBER.

Day of Month.	Apparent Right Ascension.			Var. of R. A. for 1 Hour.	Apparent Declination.			Var. of Decl. for 1 Hour.	Meridian Passage.
	h	m	s		°	'	"		
	Noon.				Noon.				
1	9	2	37.32	+4.860	+18	30	43.6	-16.78	18 22.3
2	9	4	33.42	4.814	18	24	1.1	16.75	18 20.3
3	9	6	28.39	4.767	18	17	19.7	16.70	18 18.3
4	9	8	22.21	4.718	18	10	39.5	16.64	18 16.2
5	9	10	14.88	4.670	18	4	0.8	16.57	18 14.1
6	9	12	6.37	+4.620	+17	57	23.9	-16.49	18 12.0
7	9	13	56.67	4.570	17	50	49.1	16.40	18 9.9
8	9	15	45.75	4.519	17	44	16.5	16.30	18 7.8
9	9	17	33.60	4.468	17	37	46.5	16.19	18 5.6
10	9	19	20.20	4.416	17	31	19.2	16.07	18 3.4
11	9	21	5.53	+4.362	+17	24	55.0	-15.94	18 1.2
12	9	22	49.58	4.308	17	18	33.9	15.80	17 59.0
13	9	24	32.34	4.254	17	12	16.3	15.66	17 56.8
14	9	26	13.79	4.200	17	6	2.4	15.50	17 54.5
15	9	27	53.92	4.144	16	59	52.4	15.33	17 52.2
16	9	29	32.72	+4.088	+16	53	46.5	-15.15	17 49.9
17	9	31	10.16	4.031	16	47	45.1	14.97	17 47.6
18	9	32	46.22	3.973	16	41	48.3	14.76	17 45.2
19	9	34	20.89	3.915	16	35	56.5	14.55	17 42.8
20	9	35	54.13	3.855	16	30	9.8	14.33	17 40.4
21	9	37	25.93	+3.794	+16	24	28.6	-14.10	17 38.0
22	9	38	56.26	3.733	16	18	53.0	13.86	17 35.6
23	9	40	25.10	3.670	16	13	23.4	13.61	17 33.1
24	9	41	52.42	3.606	16	8	0.1	13.34	17 30.6
25	9	43	18.20	3.541	16	2	43.4	13.06	17 28.1
26	9	44	42.40	+3.475	+15	57	33.7	-12.76	17 25.5
27	9	46	4.99	3.407	15	52	31.1	12.45	17 22.9
28	9	47	25.95	3.338	15	47	36.1	12.13	17 20.3
29	9	48	45.24	3.268	15	42	48.7	11.80	17 17.7
30	9	50	2.84	3.197	15	38	9.5	11.46	17 15.0
31	9	51	18.71	+3.124	+15	33	38.7	-11.10	17 12.3
32	9	52	32.80	+3.049	+15	29	16.7	-10.73	17 9.6

DECEMBER.

Day of Month.	Apparent Right Ascension.			Var. of R. A. for 1 Hour.	Apparent Declination.			Var. of Decl. for 1 Hour.	Meridian Passage.
	h	m	s		°	'	"		
	Noon.				Noon.				
1	9	51	18.71	+3.124	+15	33	38.7	-11.10	17 12.3
2	9	52	32.80	3.049	15	29	16.7	10.73	17 9.6
3	9	53	45.07	2.973	15	25	3.8	10.34	17 6.8
4	9	54	55.50	2.895	15	21	0.4	9.94	17 4.1
5	9	56	4.04	2.816	15	17	6.8	9.53	17 1.3
6	9	57	10.66	+2.735	+15	13	23.2	-9.10	16 58.4
7	9	58	15.33	2.653	15	9	50.0	8.66	16 55.5
8	9	59	18.01	2.569	15	6	27.4	8.21	16 52.6
9	10	0	18.66	2.484	15	3	15.8	7.75	16 49.7
10	10	1	17.25	2.397	15	0	15.3	7.28	16 46.7
11	10	2	13.75	+2.309	+14	57	26.3	-6.80	16 43.7
12	10	3	8.12	2.220	14	54	49.0	6.30	16 40.6
13	10	4	0.34	2.130	14	52	23.8	5.80	16 37.5
14	10	4	50.36	2.038	14	50	10.8	5.28	16 34.4
15	10	5	38.14	1.943	14	48	10.3	4.76	16 31.2
16	10	6	23.65	+1.848	+14	46	22.5	-4.22	16 28.0
17	10	7	6.85	1.751	14	44	47.8	3.67	16 24.8
18	10	7	47.70	1.652	14	43	26.4	3.11	16 21.5
19	10	8	26.16	1.552	14	42	18.8	2.53	16 18.2
20	10	9	2.18	1.449	14	41	25.1	1.94	16 14.8
21	10	9	35.72	+1.345	+14	40	45.5	-1.35	16 11.4
22	10	10	6.74	1.239	14	40	20.3	0.74	16 7.9
23	10	10	35.19	1.131	14	40	9.9	-0.12	16 4.4
24	10	11	1.03	1.021	14	40	14.4	+0.50	16 0.9
25	10	11	24.20	0.909	14	40	34.1	1.14	15 57.3
26	10	11	44.66	+0.795	+14	41	9.2	+1.79	15 53.7
27	10	12	2.37	0.680	14	42	0.1	2.45	15 50.0
28	10	12	17.28	0.562	14	43	6.8	3.12	15 46.3
29	10	12	29.35	0.443	14	44	29.6	3.79	15 42.6
30	10	12	38.52	0.321	14	46	8.6	4.47	15 38.8
31	10	12	44.75	+0.198	+14	48	4.2	+5.16	15 34.9
32	10	12	48.00	+0.073	+14	50	16.4	+5.86	15 31.0

Day of the Month.	1st.	6th.	11th.	16th.	21st.	26th.	Day of the Month.	1st.	6th.	11th.	16th.	21st.	26th.	31st.
Semidiameter	3.83	3.95	4.08	4.23	4.38	4.55	Semidiameter	4.72	4.92	5.12	5.34	5.57	5.81	6.06
Horizontal Parallax	6.67	6.89	7.12	7.37	7.63	7.92	Horizontal Par.	8.23	8.57	8.93	9.31	9.71	10.13	10.56

Note.—The sign + prefixed to the hourly change of declination indicates that north declinations are increasing; the sign - indicates that north declinations are decreasing.

GREENWICH MEAN TIME.

JANUARY.						FEBRUARY.					
Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.	Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Miles
	Noon.	Noon.	Noon.	Noon.			Noon.	Noon.	Noon.	Noon.	
	h m s	s	° ' "	"	h m		h m s	s	° ' "	"	h
1	21 40 32.01	+2.027	-14 52 10.9	+10.23	2 59.9	1	22 7 21.24	+2.258	-12 30 59.9	+12.34	1
2	21 41 20.79	2.038	14 48 4.2	10.32	2 56.8	2	22 8 15.46	2.262	12 26 3.1	12.39	1
3	21 42 9.84	2.049	14 43 55.5	10.41	2 53.7	3	22 9 9.76	2.265	12 21 5.1	12.44	1
4	21 42 59.15	2.060	14 39 44.8	10.49	2 50.6	4	22 10 4.14	2.268	12 16 6.0	12.48	1
5	21 43 48.72	2.071	14 35 32.0	10.57	2 47.5	5	22 10 58.60	2.271	12 11 5.8	12.53	1
6	21 44 38.54	+2.081	-14 31 17.3	+10.65	2 44.4	6	22 11 53.13	+2.274	-12 6 4.5	+12.58	1
7	21 45 28.60	2.091	14 27 0.7	10.73	2 41.3	7	22 12 47.72	2.276	12 1 2.1	12.62	1
8	21 46 18.91	2.101	14 22 42.2	10.81	2 38.2	8	22 13 42.36	2.278	11 55 58.7	12.66	1
9	21 47 9.45	2.111	14 18 21.8	10.89	2 35.1	9	22 14 37.06	2.280	11 50 54.4	12.70	1
10	21 48 0.21	2.120	14 13 59.6	10.96	2 32.0	10	22 15 31.82	2.282	11 45 49.1	12.74	0
11	21 48 51.20	+2.129	-14 9 35.5	+11.04	2 28.9	11	22 16 26.62	+2.283	-11 40 42.8	+12.78	0
12	21 49 42.40	2.138	14 5 9.6	11.11	2 25.8	12	22 17 21.45	2.285	11 35 35.6	12.82	0
13	21 50 33.80	2.147	14 0 42.0	11.19	2 22.7	13	22 18 16.32	2.286	11 30 27.6	12.85	0
14	21 51 25.41	2.155	13 56 12.7	11.26	2 19.6	14	22 19 11.21	2.287	11 25 18.8	12.88	0
15	21 52 17.21	2.163	13 51 41.6	11.33	2 16.6	15	22 20 6.13	2.288	11 20 9.2	12.91	0
16	21 53 9.19	+2.170	-13 47 8.8	+11.40	2 13.5	16	22 21 1.07	+2.289	-11 14 58.9	+12.94	0
17	21 54 1.35	2.178	13 42 34.3	11.47	2 10.4	17	22 21 56.02	2.289	11 9 47.8	12.97	0
18	21 54 53.69	2.185	13 37 58.2	11.54	2 7.4	18	22 22 50.96	2.289	11 4 36.1	13.00	0
19	21 55 46.20	2.192	13 33 20.5	11.61	2 4.3	19	22 23 45.91	2.289	10 59 23.8	13.02	0
20	21 56 38.87	2.198	13 28 41.2	11.67	2 1.3	20	22 24 40.85	2.289	10 54 10.9	13.05	0
21	21 57 31.70	+2.204	-13 24 0.4	+11.73	1 58.2	21	22 25 35.78	+2.289	-10 48 57.4	+13.07	0
22	21 58 24.67	2.210	13 19 18.2	11.79	1 55.1	22	22 26 30.70	2.288	10 43 43.4	13.09	0
23	21 59 17.79	2.216	13 14 34.5	11.85	1 52.1	23	22 27 25.60	2.288	10 38 28.9	13.11	0
24	22 0 11.04	2.222	13 9 49.3	11.91	1 49.0	24	22 28 20.48	2.287	10 33 13.9	13.13	0
25	22 1 4.42	2.228	13 5 2.8	11.97	1 46.0	25	22 29 15.33	2.285	10 27 58.5	13.15	0
26	22 1 57.92	+2.233	-13 0 14.9	+12.03	1 43.0	26	22 30 10.14	+2.284	-10 22 42.7	+13.16	0
27	22 2 51.54	2.238	12 55 25.6	12.08	1 39.9	27	22 31 4.91	2.283	10 17 26.6	13.18	0
28	22 3 45.27	2.242	12 50 35.0	12.14	1 36.9	28	22 31 59.64	2.280	10 12 10.1	13.19	0
29	22 4 39.11	2.246	12 45 43.1	12.19	1 33.8	29	22 32 54.33	2.278	10 6 53.3	13.20	0
30	22 5 33.06	2.250	12 40 49.9	12.24	1 30.8	30	22 33 48.96	2.276	10 1 36.3	13.21	0
31	22 6 27.11	+2.254	-12 35 55.5	+12.29	1 27.8	31	22 34 43.54	+2.273	-9 56 19.0	+13.22	0
32	22 7 21.24	+2.258	-12 30 59.9	+12.34	1 24.7	32	22 35 38.06	+2.271	-9 51 1.5	+13.23	0
Day of the Month.						Day of the Month.					
	0	8th.	16th.	24th.			1st.	9th.	17th.	25	
Semidiameter . . .	16.56	16.33	16.13	15.98		Semidiameter . . .	15.86	15.77	15.72	15.67	
Horizontal Parallax	1.55	1.53	1.51	1.49		Horizontal Parallax	1.48	1.47	1.47	1.46	

NOTE.—The sign — indicates south declinations.

GREENWICH MEAN TIME.

MARCH.

APRIL.

Day of Month.	Apparent Right Ascension.			Var. of R. A. for 1 Hour.	Apparent Declination.			Var. of Decl. for 1 Hour.	Meridian Passage.	Day of Month.	Apparent Right Ascension.			Var. of R. A. for 1 Hour.	Apparent Declination.			Var. of Decl. for 1 Hour.	Meridian Passage.
	h	m	s		°	'	"				h	m	s		°	'	"		
1	22	32	54.33	+2.278	-10	6	53.3	+13.20	23 57.0	1	23	0	23.40	+2.126	-7	23	50.3	+12.84	22 22.5
2	22	33	48.96	2.276	10	1	36.3	13.21	23 54.0	2	23	1	14.32	2.118	7	18	42.5	12.81	22 19.4
3	22	34	43.54	2.273	9	56	19.0	13.22	23 51.0	3	23	2	5.05	2.110	7	13	35.5	12.77	22 16.3
4	22	35	38.06	2.271	9	51	1.5	13.23	23 48.0	4	23	2	55.58	2.102	7	8	29.4	12.73	22 13.2
5	22	36	32.53	2.268	9	45	43.8	13.24	23 44.9	5	23	3	45.91	2.094	7	3	24.3	12.69	22 10.1
6	22	37	26.93	+2.265	-	9	40	25.9	+13.24	6	23	4	36.05	+2.085	-6	58	20.2	+12.65	22 7.0
7	22	38	21.26	2.262	9	35	7.9	13.25	23 38.9	7	23	5	25.98	2.076	6	53	17.0	12.61	22 3.9
8	22	39	15.52	2.259	9	29	49.8	13.25	23 35.8	8	23	6	15.71	2.067	6	48	14.9	12.57	22 0.8
9	22	40	9.70	2.255	9	24	31.6	13.26	23 32.8	9	23	7	5.22	2.058	6	43	13.9	12.52	21 57.6
10	22	41	3.80	2.252	9	19	13.5	13.26	23 29.7	10	23	7	54.51	2.049	6	38	14.0	12.47	21 54.5
11	22	41	57.81	+2.248	-	9	13	55.4	+13.25	11	23	8	43.58	+2.040	-6	33	15.4	+12.42	21 51.4
12	22	42	51.72	2.244	9	8	37.4	13.25	23 23.7	12	23	9	32.42	2.030	6	28	18.0	12.37	21 48.3
13	22	43	45.54	2.240	9	3	19.4	13.24	23 20.6	13	23	10	21.02	2.020	6	23	21.8	12.32	21 45.1
14	22	43	39.26	2.236	8	58	1.6	13.24	23 17.6	14	23	11	9.38	2.010	6	18	27.0	12.26	21 42.0
15	22	45	32.87	2.232	8	52	44.0	13.23	23 14.6	15	23	11	57.49	2.000	6	13	33.6	12.20	21 38.9
16	22	46	26.37	+2.227	-	8	47	26.6	+13.22	16	23	12	45.35	+1.990	-6	8	41.6	+12.14	21 35.7
17	22	47	19.75	2.222	8	42	9.5	13.21	23 8.5	17	23	13	32.95	1.979	6	3	51.0	12.08	21 32.6
18	22	48	13.01	2.217	8	36	52.7	13.20	23 5.4	18	23	14	20.30	1.968	5	59	1.9	12.01	21 29.4
19	22	49	6.15	2.212	8	31	36.2	13.18	23 2.4	19	23	15	7.38	1.957	5	54	14.4	11.95	21 26.3
20	22	49	59.16	2.206	8	26	20.1	13.16	22 59.3	20	23	15	54.19	1.946	5	49	28.4	11.88	21 23.1
21	22	50	52.03	+2.200	-	8	21	4.4	+13.14	21	23	16	40.73	+1.934	-5	44	44.0	+11.81	21 20.0
22	22	51	44.75	2.194	8	15	49.2	13.12	22 53.2	22	23	17	26.98	1.922	5	40	1.3	11.74	21 16.8
23	22	52	37.33	2.188	8	10	34.5	13.10	22 50.1	23	23	18	12.95	1.910	5	35	20.3	11.67	21 13.6
24	22	53	29.76	2.182	8	5	20.4	13.08	22 47.1	24	23	18	58.63	1.898	5	30	41.0	11.60	21 10.4
25	22	54	22.04	2.176	8	0	6.8	13.05	22 44.0	25	23	19	44.01	1.886	5	26	3.4	11.53	21 7.2
26	22	55	14.17	+2.170	-	7	54	53.8	+13.03	26	23	20	29.10	+1.873	-5	21	27.6	+11.45	21 4.0
27	22	56	6.13	2.163	7	49	41.4	13.00	22 37.9	27	23	21	13.89	1.860	5	16	53.7	11.38	21 0.8
28	22	56	57.93	2.156	7	44	29.7	12.97	22 34.8	28	23	21	58.38	1.847	5	12	21.6	11.30	20 57.6
29	22	57	49.56	2.148	7	39	18.7	12.94	22 31.7	29	23	22	42.55	1.834	5	7	51.4	11.22	20 54.4
30	22	58	41.02	2.141	7	34	8.5	12.91	22 28.6	30	23	23	26.41	1.821	5	3	23.2	11.14	20 51.2
31	22	59	32.30	+2.133	-	7	28	59.0	+12.88	31	23	24	9.95	+1.808	-4	58	56.9	+11.06	20 48.0
32	23	0	23.40	+2.126	-	7	23	50.3	+12.84	32	23	24	53.17	+1.794	-4	54	32.6	+10.97	20 44.8
Day of the Month.										Day of the Month.									
5th.										6th.									
13th.										14th.									
21st.										22d.									
29th.										30th.									
Semidiameter . . .										Semidiameter . . .									
Horizontal Parallax										Horizontal Parallax									
15.73										16.16									
1.47										1.51									
15.79										16.36									
1.48										1.53									
15.88										16.59									
1.48										1.55									
16.00										16.86									
1.49										1.58									

NOTE.—The sign + prefixed to the hourly change of declination indicates that south declinations are decreasing.

GREENWICH MEAN TIME.

MAY.						JUNE.						
Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.	Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.	
	Noon.	Noon.	Noon.	Noon.			Noon.	Noon.	Noon.	Noon.		
	h m s	s	° ' "	"	h m		h m s	s	° ' "	"	h	
1	23 24 9.95	+1.808	-4 58 56.9	+11.06	20 48.0	1	23 43 31.49	+1.277	-3 1 33.2	+7.60	19 5	
2	23 24 53.17	1.794	4 54 32.6	10.97	20 44.8	2	23 44 1.91	1.256	2 58 32.4	7.47	19 1	
3	23 25 36.06	1.780	4 50 10.3	10.89	20 41.6	3	23 44 31.82	1.235	2 55 34.9	7.33	18 58	
4	23 26 18.62	1.766	4 45 50.1	10.80	20 38.4	4	23 45 1.23	1.214	2 52 40.8	7.19	18 54	
5	23 27 0.84	1.752	4 41 32.1	10.71	20 35.1	5	23 45 30.12	1.192	2 49 50.1	7.04	18 51	
6	23 27 42.71	+1.737	-4 37 16.2	+10.61	20 31.9	6	23 45 58.49	+1.170	-2 47 2.9	+6.89	18 48	
7	23 28 24.23	1.723	4 33 2.6	10.52	20 28.6	7	23 46 26.33	1.148	2 44 19.2	6.75	18 44	
8	23 29 5.40	1.708	4 28 51.2	10.42	20 25.4	8	23 46 53.64	1.126	2 41 39.1	6.60	18 41	
9	23 29 46.20	1.693	4 24 42.2	10.32	20 22.1	9	23 47 20.40	1.103	2 39 2.6	6.45	18 37	
10	23 30 26.64	1.677	4 20 35.5	10.22	20 18.9	10	23 47 46.61	1.080	2 36 29.8	6.29	18 34	
11	23 31 6.70	+1.661	-4 16 31.2	+10.12	20 15.6	11	23 48 12.26	+1.057	-2 34 0.8	+6.13	18 30.	
12	23 31 46.38	1.645	4 12 29.4	10.02	20 12.3	12	23 48 37.35	1.034	2 31 35.5	5.98	18 27.	
13	23 32 25.67	1.629	4 8 30.1	9.92	20 9.0	13	23 49 1.88	1.010	2 29 14.0	5.82	18 23	
14	23 33 4.58	1.612	4 4 33.3	9.81	20 5.7	14	23 49 25.83	0.986	2 26 56.3	5.66	18 19	
15	23 33 43.09	1.596	4 0 39.1	9.70	20 2.4	15	23 49 49.20	0.962	2 24 42.4	5.50	18 16	
16	23 34 21.19	+1.579	-3 56 47.6	+ 9.59	19 59.1	16	23 50 11.99	+0.938	-2 22 32.5	+5.33	18 12	
17	23 34 58.88	1.562	3 52 58.8	9.48	19 55.8	17	23 50 34.19	0.913	2 20 26.5	5.17	18 9	
18	23 35 36.15	1.545	3 49 12.7	9.36	19 52.5	18	23 50 55.79	0.888	2 18 24.5	5.00	18 5	
19	23 36 13.01	1.527	3 45 29.3	9.25	19 49.2	19	23 51 16.79	0.863	2 16 26.4	4.84	18 2	
20	23 36 49.44	1.509	3 41 48.7	9.13	19 45.8	20	23 51 37.18	0.838	2 14 32.4	4.67	17 58	
21	23 37 25.44	+1.491	-3 38 11.0	+ 9.01	19 42.5	21	23 51 56.96	+0.812	-2 12 42.5	+4.50	17 54	
22	23 38 1.00	1.473	3 34 36.1	8.89	19 39.1	22	23 52 16.12	0.786	2 10 56.6	4.33	17 51	
23	23 38 36.12	1.454	3 31 4.1	8.77	19 35.8	23	23 52 34.66	0.760	2 9 14.9	4.15	17 47	
24	23 39 10.80	1.435	3 27 35.1	8.65	19 32.4	24	23 52 52.57	0.734	2 7 37.3	3.98	17 43	
25	23 39 45.02	1.416	3 24 9.0	8.52	19 29.1	25	23 53 9.85	0.707	2 6 3.9	3.80	17 40	
26	23 40 18.79	+1.397	-3 20 46.0	+ 8.40	19 25.7	26	23 53 26.50	+0.680	-2 4 34.6	+3.63	17 36	
27	23 40 52.09	1.378	3 17 26.0	8.27	19 22.3	27	23 53 42.52	0.653	2 3 9.6	3.45	17 33	
28	23 41 24.93	1.358	3 14 9.1	8.14	19 18.9	28	23 53 57.89	0.626	2 1 48.9	3.27	17 29	
29	23 41 57.29	1.338	3 10 55.3	8.01	19 15.5	29	23 54 12.61	0.599	2 0 32.5	3.09	17 25	
30	23 42 29.18	1.318	3 7 44.7	7.87	19 12.1	30	23 54 26.67	0.572	1 59 20.4	2.91	17 21.	
31	23 43 0.58	+1.298	-3 4 37.3	+ 7.74	19 8.7	31	23 54 40.07	+0.544	-1 58 12.7	+2.73	17 18.	
32	23 43 31.49	+1.277	-3 1 33.2	+ 7.60	19 5.2	32	23 54 52.81	+0.516	-1 57 9.4	+2.55	17 14.	
Day of the Month.					8th.	16th.	24th.	Day of the Month.				
Semidiameter					17.16	17.50	17.87	Semidiameter				
Horizontal Parallax					1.61	1.64	1.67	Horizontal Parallax				
					"	"	"					
					"	"	"					
					"	"	"					

NOTE.—The sign — indicates south declinations.

GREENWICH MEAN TIME.

JULY.						AUGUST.					
Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.	Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.
	Noon.	Noon.	Noon.	Noon.			Noon.	Noon.	Noon.	Noon.	
	h m s	s	" ' "	"	h m		h m s	s	" ' "	"	h m
1	23 54 40.07	+0.544	-1 58 12.7	+2.73	17 18.2	1	23 55 47.94	-0.370	-2 1 0.5	-3.19	15 17.1
2	23 54 52.81	0.516	1 57 9.4	2.55	17 14.5	2	23 55 38.72	0.399	2 2 19.1	3.37	15 13.0
3	23 55 4.88	0.488	1 56 10.5	2.36	17 10.7	3	23 55 28.80	0.428	2 3 42.2	3.55	15 8.9
4	23 55 16.27	0.460	1 55 16.0	2.18	17 6.9	4	23 55 18.18	0.457	2 5 9.6	3.73	15 4.8
5	23 55 26.97	0.431	1 54 26.1	1.99	17 3.2	5	23 55 6.86	0.486	2 6 41.4	3.91	15 0.7
6	23 55 36.98	+0.403	-1 53 40.7	+1.80	16 59.4	6	23 54 54.86	-0.514	-2 8 17.5	-4.09	14 56.5
7	23 55 46.31	0.374	1 52 59.8	1.61	16 55.6	7	23 54 42.17	0.542	2 9 57.9	4.27	14 52.4
8	23 55 54.94	0.345	1 52 23.5	1.42	16 51.8	8	23 54 28.81	0.570	2 11 42.4	4.44	14 48.2
9	23 56 2.87	0.316	1 51 51.7	1.23	16 48.0	9	23 54 14.79	0.598	2 13 31.1	4.61	14 44.1
10	23 56 10.10	0.287	1 51 24.5	1.04	16 44.2	10	23 54 0.11	0.625	2 15 23.8	4.78	14 39.9
11	23 56 16.62	+0.257	-1 51 2.0	+0.84	16 40.4	11	23 53 44.77	-0.652	-2 17 20.6	-4.95	14 35.7
12	23 56 22.43	0.228	1 50 44.2	0.65	16 36.5	12	23 53 28.79	0.679	2 19 41.3	5.11	14 31.5
13	23 56 27.52	0.198	1 50 31.1	0.45	16 32.7	13	23 53 12.17	0.705	2 21 25.9	5.27	14 27.3
14	23 56 31.89	0.168	1 50 22.6	0.26	16 28.8	14	23 52 54.93	0.731	2 23 34.2	5.42	14 23.1
15	23 56 35.55	0.138	1 50 18.8	+0.06	16 24.9	15	23 52 37.08	0.756	2 25 46.2	5.57	14 18.9
16	23 56 38.50	+0.108	-1 50 19.6	-0.13	16 21.0	16	23 52 18.63	-0.781	-2 28 1.8	-5.72	14 14.6
17	23 56 40.73	0.078	1 50 25.1	0.33	16 17.1	17	23 51 59.59	0.805	2 30 21.0	5.87	14 10.4
18	23 56 42.23	0.048	1 50 35.3	0.52	16 13.2	18	23 51 39.97	0.829	2 32 43.6	6.01	14 6.1
19	23 56 43.02	+0.018	1 50 50.1	0.71	16 9.3	19	23 51 19.79	0.852	2 35 9.6	6.15	14 1.8
20	23 56 43.09	-0.012	1 51 9.5	0.91	16 5.3	20	23 50 59.06	0.875	2 37 38.8	6.28	13 57.5
21	23 56 42.44	-0.042	-1 51 33.5	-1.10	16 1.4	21	23 50 37.80	-0.897	-2 40 11.1	-6.41	13 53.2
22	23 56 41.07	0.072	1 52 2.2	1.29	15 57.4	22	23 50 16.01	0.919	2 42 46.5	6.53	13 48.9
23	23 56 38.98	0.102	1 52 35.5	1.48	15 53.4	23	23 49 53.71	0.940	2 45 24.8	6.65	13 44.6
24	23 56 36.17	0.132	1 53 13.4	1.68	15 49.4	24	23 49 30.91	0.960	2 48 6.0	6.77	13 40.3
25	23 56 32.64	0.162	1 53 55.9	1.87	15 45.4	25	23 49 7.63	0.980	2 50 50.0	6.88	13 36.0
26	23 56 28.39	-0.192	-1 54 42.9	-2.06	15 41.4	26	23 48 43.89	-0.999	-2 53 36.6	-6.99	13 31.7
27	23 56 23.43	0.222	1 55 34.5	2.25	15 37.4	27	23 48 19.69	1.017	2 56 25.7	7.10	13 27.3
28	23 56 17.76	0.252	1 56 30.7	2.44	15 33.4	28	23 47 55.05	1.035	2 59 17.3	7.20	13 23.0
29	23 56 11.37	0.282	1 57 31.4	2.63	15 29.3	29	23 47 29.99	1.052	3 2 11.2	7.29	13 18.6
30	23 56 4.27	0.312	1 58 36.6	2.82	15 25.3	30	23 47 4.52	1.069	3 5 7.4	7.38	13 14.3
31	23 55 56.46	-0.341	-1 59 46.3	-3.00	15 21.2	31	23 46 38.66	-1.085	-3 8 5.7	-7.47	13 9.9
32	23 55 47.94	-0.370	-2 1 0.5	-3.19	15 17.1	32	23 46 12.44	-1.100	-3 11 5.9	-7.55	13 5.6
Day of the Month.						Day of the Month.					
3d.						4th.					
11th.						12th.					
19th.						20th.					
27th.						28th.					
"						"					
"						"					
"						"					
"						"					
Semidiameter . . .						Semidiameter . . .					
Horizontal Parallax						Horizontal Parallax					

NOTE.—The sign + prefixed to the hourly change of declination indicates that south declinations are decreasing; the sign - indicates that south declinations are increasing.

GREENWICH MEAN TIME.

SEPTEMBER.						OCTOBER.											
Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.	Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.						
	Noon.	Noon.	Noon.	Noon.			Noon.	Noon.	Noon.	Noon.							
	h m s	s	° ' "	"	h m		h m s	s	° ' "	"	h m						
1	23 46 12.44	-1.100	-3 11 5.9	-7.55	13 5.6	1	23 31 56.30	-1.141	-4 44 44.2	-7.17	10 53.4						
2	23 45 45.86	1.114	3 14 7.9	7.62	13 1.2	2	23 31 29.05	1.129	4 47 35.0	7.07	10 49.0						
3	23 45 18.95	1.128	3 17 11.7	7.69	12 56.8	3	23 31 2.11	1.116	4 50 23.3	6.96	10 44.7						
4	23 44 51.73	1.141	3 20 17.0	7.75	12 52.4	4	23 30 35.51	1.102	4 53 8.9	6.85	10 40.3						
5	23 44 24.20	1.153	3 23 23.8	7.81	12 48.0	5	23 30 9.25	1.087	4 55 51.8	6.73	10 35.9						
6	23 43 56.39	-1.164	-3 26 31.9	-7.86	12 43.6	6	23 29 43.36	-1.071	-4 58 31.8	-6.61	10 31.6						
7	23 43 28.33	1.174	3 29 41.2	7.91	12 39.2	7	23 29 17.87	1.054	5 1 8.7	6.48	10 27.2						
8	23 43 0.04	1.183	3 32 51.5	7.95	12 34.8	8	23 28 52.79	1.036	5 3 42.5	6.35	10 22.9						
9	23 42 31.54	1.191	3 36 2.6	7.98	12 30.4	9	23 28 28.15	1.018	5 6 13.1	6.21	10 18.5						
10	23 42 2.85	1.198	3 39 14.5	8.00	12 26.0	10	23 28 3.96	0.999	5 8 40.3	6.07	10 14.2						
11	23 41 33.99	-1.204	-3 42 26.9	-8.02	12 21.6	11	23 27 40.23	-0.979	-5 11 4.1	-5.98	10 9.8						
12	23 41 4.99	1.210	3 45 39.7	8.03	12 17.2	12	23 27 16.99	0.958	5 13 24.3	5.77	10 5.5						
13	23 40 35.87	1.215	3 48 52.7	8.04	12 12.8	13	23 26 54.25	0.937	5 15 40.9	5.61	10 1.2						
14	23 40 6.65	1.218	3 52 5.8	8.04	12 8.3	14	23 26 32.02	0.915	5 17 53.7	5.45	9 56.9						
15	23 39 37.36	1.221	3 55 18.8	8.04	12 3.9	15	23 26 10.33	0.892	5 20 2.7	5.29	9 52.6						
16	23 39 8.02	-1.223	-3 58 31.6	-8.03	11 59.5	16	23 25 49.21	-0.869	-5 22 7.7	-5.13	9 48.3						
17	23 38 38.64	1.224	4 1 44.1	8.01	11 55.1	17	23 25 28.65	0.845	5 24 8.7	4.96	9 44.1						
18	23 38 9.26	1.224	4 4 56.1	7.99	11 50.7	18	23 25 8.67	0.821	5 26 5.6	4.79	9 39.8						
19	23 37 39.89	1.223	4 8 7.5	7.96	11 46.3	19	23 24 49.27	0.796	5 27 58.4	4.61	9 35.6						
20	23 37 10.55	1.221	4 11 18.1	7.92	11 41.9	20	23 24 30.47	0.771	5 29 47.0	4.44	9 31.3						
21	23 36 41.27	-1.218	-4 14 27.7	-7.88	11 37.4	21	23 24 12.28	-0.745	-5 31 31.3	-4.26	9 27.1						
22	23 36 12.07	1.214	4 17 36.3	7.83	11 33.0	22	23 23 54.72	0.719	5 33 11.3	4.08	9 22.9						
23	23 35 42.97	1.209	4 20 43.7	7.78	11 28.6	23	23 23 37.80	0.692	5 34 46.9	3.89	9 18.7						
24	23 35 13.99	1.204	4 23 49.8	7.72	11 24.2	24	23 23 21.52	0.665	5 36 18.2	3.71	9 14.5						
25	23 34 45.15	1.198	4 26 54.4	7.66	11 19.8	25	23 23 5.90	0.637	5 37 45.0	3.52	9 10.3						
26	23 34 16.48	-1.191	-4 29 57.5	-7.59	11 15.4	26	23 22 50.94	-0.609	-5 39 7.2	-3.33	9 6.1						
27	23 33 47.99	1.183	4 32 58.8	7.52	11 11.0	27	23 22 36.66	0.581	5 40 24.9	3.14	9 2.0						
28	23 33 19.71	1.174	4 35 58.2	7.44	11 6.6	28	23 22 23.06	0.552	5 41 38.0	2.95	8 57.8						
29	23 32 51.66	1.164	4 38 55.7	7.35	11 2.2	29	23 22 10.16	0.523	5 42 46.4	2.75	8 53.7						
30	23 32 23.85	1.153	4 41 51.1	7.26	10 57.8	30	23 21 57.96	0.494	5 43 50.2	2.56	8 49.6						
31	23 31 56.30	-1.141	-4 44 44.2	-7.17	10 53.4	31	23 21 46.46	-0.464	-5 44 49.2	-2.36	8 45.5						
32	23 31 29.05	-1.129	-4 47 35.0	-7.07	10 49.0	32	23 21 35.67	-0.434	-5 45 43.4	-2.16	8 41.4						
Day of the Month.					5th.	18th.	31st.	29th.	Day of the Month.					7th.	15th.	28d.	31st.
Semidiameter . . .					23.64	23.75	23.74	23.62	Semidiameter . . .					23.39	23.06	22.66	22.19
Horizontal Parallax					2.21	2.22	2.22	2.21	Horizontal Parallax					2.19	2.16	2.12	2.07

NOTE.—The sign — indicates south declinations.

GREENWICH MEAN TIME.

NOVEMBER.

DECEMBER.

Day of Month.	NOVEMBER.				Day of Month.	DECEMBER.						
	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.		Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.			
	Noon.	Noon.	Noon.	Noon.		Noon.	Noon.	Noon.	Noon.			
	h m s	s	° ' "	"	h m	h m s	s	° ' "	"	h m		
1	23 21 35.67	-0.434	5 45 43.4	-2.16	8 41.4	1	23 22 1.66	+0.304	-5 34 54.0	+3.90	6 43.9	
2	23 21 25.61	-0.404	5 46 32.8	1.96	8 37.3	2	23 22 14.11	0.534	5 33 18.2	4.09	6 40.2	
3	23 21 16.28	-0.374	5 47 17.4	1.76	8 33.2	3	23 22 27.29	0.564	5 31 37.7	4.28	6 36.5	
4	23 21 7.69	-0.343	5 47 57.1	1.55	8 29.1	4	23 22 41.18	0.594	5 29 52.7	4.47	6 32.8	
5	23 20 59.83	-0.312	5 48 31.9	1.35	8 25.1	5	23 22 55.78	0.623	5 28 3.2	4.66	6 29.1	
6	23 20 52.72	-0.282	5 49 1.8	-1.14	8 21.0	6	23 23 11.09	+0.652	-5 26 9.2	+4.84	6 25.4	
7	23 20 46.36	-0.250	5 49 26.8	0.94	8 17.0	7	23 23 27.09	0.681	5 24 10.8	5.03	6 21.8	
8	23 20 40.76	-0.218	5 49 46.8	0.73	8 13.0	8	23 23 43.79	0.710	5 22 8.0	5.21	6 18.1	
9	23 20 35.92	-0.187	5 50 1.8	0.52	8 9.0	9	23 24 1.18	0.738	5 20 0.8	5.39	6 14.5	
10	23 20 31.85	-0.155	5 50 11.8	0.31	8 5.0	10	23 24 19.26	0.767	5 17 49.3	5.57	6 10.8	
11	23 20 28.54	-0.123	5 50 16.9	-0.11	8 1.0	11	23 24 38.02	+0.795	-5 15 33.5	+5.75	6 7.2	
12	23 20 26.00	-0.091	5 50 17.0	+0.10	7 57.0	12	23 24 57.44	0.823	5 13 13.5	5.92	6 3.6	
13	23 20 24.22	-0.059	5 50 12.1	0.30	7 53.0	13	23 25 17.53	0.851	5 10 49.3	6.10	6 0.0	
14	23 20 23.20	-0.027	5 50 2.3	0.51	7 49.1	14	23 25 38.27	0.878	5 8 20.9	6.27	5 56.4	
15	23 20 22.95	+0.005	5 49 47.5	0.71	7 45.1	15	23 25 59.66	0.905	5 5 48.5	6.44	5 52.8	
16	23 20 23.47	+0.038	5 49 27.8	+0.92	7 41.2	16	23 26 21.69	+0.931	-5 3 12.0	+6.61	5 49.3	
17	23 20 24.75	0.069	5 49 3.2	1.12	7 37.3	17	23 26 44.36	0.957	5 0 31.5	6.77	5 45.7	
18	23 20 26.79	0.100	5 48 33.7	1.33	7 33.4	18	23 27 7.65	0.983	4 57 47.0	6.93	5 42.2	
19	23 20 29.59	0.132	5 47 59.3	1.53	7 29.5	19	23 27 31.56	1.009	4 54 58.7	7.09	5 38.6	
20	23 20 33.15	0.163	5 47 20.1	1.74	7 25.7	20	23 27 56.08	1.034	4 52 6.5	7.25	5 35.1	
21	23 20 37.47	+0.194	5 46 36.1	+1.94	7 21.8	21	23 28 21.20	+1.059	-4 49 10.5	+7.41	5 31.6	
22	23 20 42.54	0.226	5 45 47.2	2.14	7 18.0	22	23 28 46.93	1.084	4 46 10.7	7.57	5 28.1	
23	23 20 48.37	0.257	5 44 53.5	2.34	7 14.2	23	23 29 13.25	1.109	4 43 7.1	7.73	5 24.6	
24	23 20 54.95	0.289	5 43 55.0	2.53	7 10.4	24	23 29 40.15	1.133	4 39 59.8	7.88	5 21.1	
25	23 21 2.26	0.320	5 42 51.8	2.73	7 6.6	25	23 30 7.63	1.157	4 36 48.9	8.03	5 17.7	
26	23 21 10.32	+0.351	5 41 43.9	+2.93	7 2.8	26	23 30 35.67	+1.181	-4 33 34.4	+8.18	5 14.2	
27	23 21 19.12	0.382	5 40 31.3	3.13	6 59.0	27	23 31 4.28	1.204	4 30 16.3	8.33	5 10.8	
28	23 21 28.66	0.413	5 39 14.0	3.32	6 55.2	28	23 31 33.45	1.227	4 26 54.6	8.47	5 7.3	
29	23 21 38.93	0.443	5 37 52.0	3.52	6 51.4	29	23 32 3.17	1.250	4 23 29.5	8.62	5 3.9	
30	23 21 49.93	0.474	5 36 25.3	3.71	6 47.7	30	23 32 33.44	1.272	4 20 0.9	8.76	5 0.4	
31	23 22 1.66	+0.504	5 34 54.0	+3.90	6 43.9	31	23 33 4.25	+1.295	-4 16 28.9	+8.90	4 57.0	
32	23 22 14.11	+0.534	5 33 18.2	+4.09	6 40.2	32	23 33 35.59	+1.317	-4 12 53.5	+9.04	4 53.6	
Day of the Month.					8th.	10th.	24th.	Day of Month.				
					"	"	"					
Semidiameter					21.68	21.14	20.60	Semidiam.				
Horizontal Parallax					2.03	1.98	1.93	Hor. Par.				

GREENWICH MEAN TIME.

JANUARY.						FEBRUARY.					
Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.	Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.
	Noon.	Noon.	Noon.	Noon.			Noon.	Noon.	Noon.	Noon.	
	h m s	s	° ' "	"	h m		h m s	s	° ' "	"	h m
1	5 51 7.53	-0.863	+22 18 51.5	+0.14	11 8.9	1	5 42 23.77	-0.482	+22 21 6.4	+0.26	8 58.4
2	5 50 46.89	0.857	22 18 54.8	0.14	11 4.6	2	5 42 12.42	0.464	22 21 12.8	0.27	8 54.3
3	5 50 26.39	0.851	22 18 58.2	0.14	11 0.4	3	5 42 1.48	0.447	22 21 19.4	0.28	8 50.2
4	5 50 6.05	0.844	22 19 1.5	0.14	10 56.1	4	5 41 50.98	0.429	22 21 26.3	0.29	8 46.1
5	5 49 45.88	0.837	22 19 4.9	0.14	10 51.8	5	5 41 40.91	0.410	22 21 33.3	0.30	8 42.0
6	5 49 25.88	-0.829	+22 19 8.3	+0.14	10 47.6	6	5 41 31.28	-0.392	+22 21 40.6	+0.31	8 37.9
7	5 49 6.08	0.821	22 19 11.7	0.14	10 43.3	7	5 41 22.10	0.373	22 21 48.0	0.32	8 33.8
8	5 48 46.48	0.812	22 19 15.2	0.13	10 39.1	8	5 41 13.37	0.354	22 21 55.7	0.33	8 29.7
9	5 48 27.09	0.803	22 19 18.7	0.13	10 34.8	9	5 41 5.09	0.335	22 22 3.6	0.33	8 25.7
10	5 48 7.93	0.794	22 19 22.3	0.13	10 30.6	10	5 40 57.27	0.316	22 22 11.8	0.34	8 21.6
11	5 47 49.01	-0.784	+22 19 25.9	+0.13	10 26.3	11	5 40 49.92	-0.297	+22 22 20.1	+0.35	8 17.6
12	5 47 30.33	0.773	22 19 29.6	0.16	10 22.1	12	5 40 43.03	0.277	22 22 28.8	0.36	8 13.5
13	5 47 11.90	0.762	22 19 33.4	0.16	10 17.8	13	5 40 36.62	0.257	22 22 37.6	0.37	8 9.5
14	5 46 53.75	0.751	22 19 37.2	0.16	10 13.6	14	5 40 30.68	0.238	22 22 46.7	0.38	8 5.5
15	5 46 35.88	0.739	22 19 41.1	0.17	10 9.4	15	5 40 25.21	0.218	22 22 56.0	0.39	8 1.4
16	5 46 18.29	-0.726	+22 19 45.2	+0.17	10 5.2	16	5 40 20.23	-0.198	+22 23 5.6	+0.40	7 57.4
17	5 46 1.01	0.714	22 19 49.3	0.17	10 0.9	17	5 40 15.73	0.177	22 23 15.4	0.41	7 53.4
18	5 45 44.04	0.701	22 19 53.5	0.18	9 56.7	18	5 40 11.72	0.157	22 23 25.4	0.42	7 49.4
19	5 45 27.39	0.687	22 19 57.8	0.18	9 52.5	19	5 40 8.19	0.137	22 23 35.7	0.43	7 45.4
20	5 45 11.07	0.673	22 20 2.3	0.19	9 48.3	20	5 40 5.15	0.116	22 23 46.2	0.44	7 41.5
21	5 44 55.08	-0.659	+22 20 6.8	+0.19	9 44.1	21	5 40 2.60	-0.096	+22 23 56.9	+0.45	7 37.5
22	5 44 39.45	0.644	22 20 11.5	0.20	9 40.0	22	5 40 0.54	0.076	22 24 7.9	0.46	7 33.5
23	5 44 24.17	0.629	22 20 16.3	0.20	9 35.8	23	5 39 58.96	0.055	22 24 19.1	0.47	7 29.6
24	5 44 9.25	0.614	22 20 21.2	0.21	9 31.6	24	5 39 57.88	0.035	22 24 30.6	0.48	7 25.6
25	5 43 54.70	0.598	22 20 26.3	0.22	9 27.4	25	5 39 57.28	-0.014	22 24 42.3	0.49	7 21.7
26	5 43 40.53	-0.583	+22 20 31.5	+0.22	9 23.3	26	5 39 57.18	+0.007	+22 24 54.2	+0.50	7 17.8
27	5 43 26.74	0.566	22 20 36.9	0.23	9 19.1	27	5 39 57.56	0.027	22 25 6.3	0.51	7 13.8
28	5 43 13.34	0.550	22 20 42.5	0.23	9 14.9	28	5 39 58.43	0.047	22 25 18.7	0.52	7 9.9
29	5 43 0.34	0.533	22 20 48.2	0.24	9 10.8	29	5 39 59.79	0.067	22 25 31.3	0.53	7 6.0
30	5 42 47.74	0.516	22 20 54.0	0.25	9 6.7	30	5 40 1.64	0.087	22 25 44.1	0.54	7 2.1
31	5 42 35.55	-0.499	+22 21 0.1	+0.26	9 2.5	31	5 40 3.97	+0.107	+22 25 57.1	+0.55	6 58.2
32	5 42 23.77	-0.482	+22 21 6.4	+0.26	8 58.4	32	5 40 6.79	+0.127	+22 26 10.3	+0.56	6 54.3
Day of the Month.	1st.	9th.	17th.	25th.		Day of the Month.	2d.	10th.	18th.	26th.	
Semidiameter . . .	"	"	"	"		Semidiameter . . .	"	"	"	"	
Horizontal Parallax	9.62 1.09	9.58 1.09	9.51 1.08	9.43 1.07		Horizontal Parallax	9.32 1.06	9.21 1.05	9.09 1.03	8.96 1.02	

NOTE.—The sign + indicates north declinations.

GREENWICH MEAN TIME.

MARCH.						APRIL.					
Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.	Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.
Noon.	Noon.	Noon.	Noon.	Noon.		Noon.	Noon.	Noon.	Noon.	Noon.	
h m s	s	° ' "	"	h m		h m s	s	° ' "	"	h m	
1 5 39 59.79	+0.067	+22 25 31.3	+0.53	7 6.0	1	5 44 36.23	+0.659	+22 33 23.8	+0.69	5 8.8	
2 5 40 1.64	0.087	22 25 44.1	0.54	7 2.1	2	5 44 52.23	0.675	22 33 40.4	0.69	5 5.1	
3 5 40 3.97	0.107	22 25 57.1	0.55	6 58.2	3	5 45 8.64	0.692	22 33 56.9	0.69	5 1.4	
4 5 40 6.79	0.127	22 26 10.3	0.56	6 54.3	4	5 45 25.46	0.709	22 34 13.4	0.69	4 57.8	
5 5 40 10.09	0.148	22 26 23.8	0.57	6 50.5	5	5 45 42.66	0.725	22 34 29.9	0.69	4 54.1	
6 5 40 13.87	+0.168	+22 26 37.5	+0.57	6 46.6	6	5 46 0.26	+0.741	+22 34 46.4	+0.68	4 50.5	
7 5 40 18.14	0.188	22 26 51.3	0.58	6 42.7	7	5 46 18.25	0.758	22 35 2.8	0.68	4 46.9	
8 5 40 22.89	0.208	22 27 5.4	0.59	6 38.9	8	5 46 36.63	0.774	22 35 19.1	0.68	4 43.2	
9 5 40 28.13	0.228	22 27 19.7	0.60	6 35.0	9	5 46 55.39	0.789	22 35 35.3	0.67	4 39.6	
10 5 40 33.84	0.248	22 27 34.1	0.61	6 31.2	10	5 47 14.52	0.805	22 35 51.5	0.67	4 36.0	
11 5 40 40.03	+0.268	+22 27 48.7	+0.61	6 27.4	11	5 47 34.03	+0.821	+22 36 7.5	+0.67	4 32.4	
12 5 40 46.70	0.288	22 28 3.5	0.62	6 23.6	12	5 47 53.90	0.836	22 36 23.4	0.66	4 28.8	
13 5 40 53.84	0.308	22 28 18.5	0.63	6 19.7	13	5 48 14.15	0.851	22 36 39.3	0.66	4 25.2	
14 5 41 1.46	0.327	22 28 33.6	0.63	6 15.9	14	5 48 34.75	0.866	22 36 54.9	0.65	4 21.6	
15 5 41 9.55	0.347	22 28 48.9	0.64	6 12.1	15	5 48 55.70	0.881	22 37 10.5	0.64	4 18.0	
16 5 41 18.11	+0.366	+22 29 4.4	+0.65	6 8.4	16	5 49 17.01	+0.895	+22 37 25.8	+0.64	4 14.5	
17 5 41 27.14	0.386	22 29 19.9	0.65	6 4.6	17	5 49 38.66	0.909	22 37 41.0	0.63	4 10.9	
18 5 41 36.63	0.405	22 29 35.6	0.66	6 0.8	18	5 50 0.66	0.923	22 37 56.1	0.62	4 7.3	
19 5 41 46.58	0.424	22 29 51.4	0.66	5 57.0	19	5 50 22.98	0.937	22 38 10.9	0.61	4 3.8	
20 5 41 56.99	0.443	22 30 7.3	0.67	5 53.3	20	5 50 45.64	0.951	22 38 25.6	0.61	4 0.2	
21 5 42 7.86	+0.462	+22 30 23.4	+0.67	5 49.5	21	5 51 8.62	+0.964	+22 38 40.0	+0.60	3 56.7	
22 5 42 19.17	0.481	22 30 39.5	0.67	5 45.8	22	5 51 31.92	0.977	22 38 54.3	0.59	3 53.1	
23 5 42 30.93	0.499	22 30 55.7	0.68	5 42.1	23	5 51 55.54	0.990	22 39 8.3	0.58	3 49.6	
24 5 42 43.14	0.518	22 31 12.0	0.68	5 38.3	24	5 52 19.46	1.003	22 39 22.0	0.57	3 46.0	
25 5 42 55.78	0.536	22 31 28.3	0.68	5 34.6	25	5 52 43.69	1.016	22 39 35.6	0.56	3 42.5	
26 5 43 8.86	+0.554	+22 31 44.7	+0.68	5 30.9	26	5 53 8.22	+1.028	+22 39 48.8	+0.55	3 39.0	
27 5 43 22.36	0.572	22 32 1.2	0.69	5 27.2	27	5 53 33.04	1.040	22 40 1.8	0.54	3 35.5	
28 5 43 36.30	0.589	22 32 17.7	0.69	5 23.5	28	5 53 58.15	1.052	22 40 14.6	0.52	3 31.9	
29 5 43 50.66	0.607	22 32 34.2	0.69	5 19.8	29	5 54 23.54	1.064	22 40 27.0	0.51	3 28.4	
30 5 44 5.43	0.624	22 32 50.7	0.69	5 16.1	30	5 54 49.22	1.076	22 40 39.2	0.50	3 24.9	
31 5 44 20.62	+0.642	+22 33 7.3	+0.69	5 12.4	31	5 55 15.17	+1.087	+22 40 51.0	+0.49	3 21.4	
32 5 44 36.23	+0.659	+22 33 23.8	+0.69	5 8.8	32	5 55 41.39	+1.098	+22 41 2.6	+0.47	3 17.9	
Day of the Month.					Day of the Month.						
Semidiameter . . .					Semidiameter						
Horizontal Parallax					Horizontal Parallax . . .						

NOTE.—The sign + prefixed to the hourly change of declination indicates that north declinations are increasing.

GREENWICH MEAN TIME.

MAY.						JUNE.											
Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.	Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.						
	Noon.	Noon.	Noon.	Noon.			Noon.	Noon.	Noon.	Noon.							
	h m s	s	" ' "	"	h m		h m s	s	" ' "	"	h m						
1	5 55 15.17	+1.087	+22 40 51.0	+0.49	3 21.4	1	6 10 31.03	+1.342	+22 43 45.6	-0.06	1 34.7						
2	5 55 41.39	1.098	22 41 2.6	0.47	3 17.9	2	6 11 3.31	1.347	22 43 43.9	0.08	1 31.3						
3	5 56 7.88	1.109	22 41 13.8	0.46	3 14.4	3	6 11 35.71	1.352	22 43 41.7	0.10	1 28.0						
4	5 56 34.63	1.120	22 41 24.8	0.45	3 11.0	4	6 12 8.22	1.357	22 43 38.9	0.13	1 24.6						
5	5 57 1.64	1.131	22 41 35.3	0.43	3 7.5	5	6 12 40.84	1.362	22 43 35.6	0.15	1 21.2						
6	5 57 28.90	+1.141	+22 41 45.6	+0.42	3 4.0	6	6 13 13.57	+1.366	+22 43 31.8	-0.17	1 17.8						
7	5 57 56.42	1.152	22 41 55.5	0.40	3 0.5	7	6 13 46.40	1.370	22 43 27.5	0.19	1 14.4						
8	5 58 24.18	1.162	22 42 5.0	0.39	2 57.0	8	6 14 19.33	1.374	22 43 22.7	0.21	1 11.0						
9	5 58 52.18	1.172	22 42 14.1	0.37	2 53.6	9	6 14 52.36	1.378	22 43 17.3	0.24	1 7.6						
10	5 59 20.42	1.181	22 42 22.9	0.36	2 50.1	10	6 15 25.47	1.381	22 43 11.4	0.26	1 4.2						
11	5 59 48.89	+1.191	+22 42 31.3	+0.34	2 46.7	11	6 15 58.66	+1.385	+22 43 4.9	-0.28	1 0.9						
12	6 0 17.58	1.200	22 42 39.2	0.32	2 43.2	12	6 16 31.93	1.388	22 42 57.9	0.30	0 57.5						
13	6 0 46.50	1.209	22 42 46.8	0.31	2 39.7	13	6 17 5.28	1.391	22 42 50.4	0.33	0 54.1						
14	6 1 15.63	1.218	22 42 54.0	0.29	2 36.3	14	6 17 38.69	1.394	22 42 42.3	0.35	0 50.7						
15	6 1 44.97	1.227	22 43 0.7	0.27	2 32.9	15	6 18 12.16	1.396	22 42 33.7	0.37	0 47.3						
16	6 2 14.52	+1.235	+22 43 7.1	+0.25	2 29.4	16	6 18 45.69	+1.398	+22 42 24.6	-0.39	0 44.0						
17	6 2 44.27	1.244	22 43 12.9	0.24	2 26.0	17	6 19 19.28	1.400	22 42 14.9	0.41	0 40.6						
18	6 3 14.21	1.252	22 43 18.4	0.22	2 22.5	18	6 19 52.91	1.402	22 42 4.7	0.44	0 37.2						
19	6 3 44.34	1.259	22 43 23.4	0.20	2 19.1	19	6 20 26.59	1.404	22 41 54.0	0.46	0 33.8						
20	6 4 14.66	1.267	22 43 28.0	0.18	2 15.7	20	6 21 0.30	1.405	22 41 42.7	0.48	0 30.5						
21	6 4 45.16	+1.274	+22 43 32.0	+0.16	2 12.3	21	6 21 34.04	+1.407	+22 41 31.0	-0.50	0 27.1						
22	6 5 15.83	1.281	22 43 35.7	0.14	2 8.8	22	6 22 7.82	1.408	22 41 18.6	0.52	0 23.7						
23	6 5 46.67	1.288	22 43 38.8	0.12	2 5.4	23	6 22 41.61	1.409	22 41 5.8	0.55	0 20.4						
24	6 6 17.67	1.295	22 43 41.5	0.10	2 2.0	24	6 23 15.43	1.409	22 40 52.5	0.57	0 17.0						
25	6 6 48.83	1.302	22 43 43.7	0.08	1 58.6	25	6 23 49.26	1.410	22 40 38.6	0.59	0 13.6						
26	6 7 20.15	+1.308	+22 43 45.5	+0.06	1 55.2	26	6 24 23.10	+1.410	+22 40 24.2	-0.51	0 10.2						
27	6 7 51.61	1.314	22 43 46.7	0.04	1 51.8	27	6 24 56.95	1.411	22 40 9.3	0.63	0 6.9						
28	6 8 23.22	1.320	22 43 47.5	+0.02	1 48.3	28	6 25 30.80	1.411	22 39 53.9	0.65	0 3.5						
29	6 8 54.97	1.326	22 43 47.8	0.00	1 44.9	29	6 26 4.65	1.410	22 39 38.0	0.67	0 0.1						
30	6 9 26.86	1.331	22 43 47.6	-0.02	1 41.5	30	6 26 38.50	1.410	22 39 21.5	0.70	23 56.8						
31	6 9 58.88	+1.337	+22 43 46.8	-0.04	1 38.1	31	6 27 12.34	+1.410	+22 39 4.6	-0.72	23 50.0						
32	6 10 31.03	+1.342	+22 43 45.6	-0.06	1 34.7	32	6 27 46.16	+1.409	+22 38 47.1	-0.74	23 46.6						
Day of the Month.					1st.	9th.	17th.	25th.	Day of the Month.					2d.	10th.	18th.	26th.
Semidiameter . . .					8.03	7.95	7.89	7.83	Semidiameter . . .					7.79	7.75	7.73	7.72
Horizontal Parallax					0.91	0.90	0.90	0.89	Horizontal Parallax					0.88	0.88	0.88	0.88

NOTE.—The sign + indicates north declinations.

GREENWICH MEAN TIME.

JULY.					AUGUST.								
Apparent Right Ascension.			Var. of R. A. for 1 Hour.	Apparent Declination.		Var. of Decl. for 1 Hour.	Meridian Passage.						
Noon.			Noon.	Noon.		Noon.	Noon.						
h m s			s	" ' "		"	h m						
1	6	27 12.34	+1.410	+22 39 4.6	-0.72	23 50.0	1	6	44 11.44	+1.299	+22 26 39.2	-1.24	22 5.0
2	6	27 46.16	1.409	22 38 47.1	0.74	23 46.6	2	6	44 42.54	1.293	22 26 9.4	1.25	22 1.6
3	6	28 19.97	1.408	22 38 29.2	0.76	23 43.3	3	6	45 13.48	1.286	22 25 39.4	1.26	21 58.1
4	6	28 53.76	1.407	22 38 10.7	0.78	23 39.9	4	6	45 44.26	1.279	22 25 9.1	1.27	21 54.7
5	6	29 27.52	1.406	22 37 51.8	0.80	23 36.5	5	6	46 14.87	1.272	22 24 38.6	1.28	21 51.3
6	6	30 1.24	+1.405	+22 37 32.4	-0.82	23 33.2	6	6	46 45.31	+1.265	+22 24 7.8	-1.29	21 47.9
7	6	30 34.93	1.403	22 37 12.5	0.84	23 29.8	7	6	47 15.57	1.257	22 23 36.9	1.29	21 44.4
8	6	31 8.59	1.401	22 36 52.1	0.86	23 26.4	8	6	47 45.64	1.249	22 23 5.8	1.30	21 41.0
9	6	31 42.19	1.399	22 36 31.2	0.88	23 23.0	9	6	48 15.53	1.241	22 22 34.4	1.31	21 37.6
10	6	32 15.75	1.397	22 36 9.9	0.90	23 19.7	10	6	48 45.22	1.233	22 22 2.9	1.32	21 34.1
1	6	32 49.24	+1.395	+22 35 48.1	-0.92	23 16.3	11	6	49 14.71	+1.225	+22 21 31.3	-1.32	21 30.7
2	6	33 22.68	1.392	22 35 25.9	0.94	23 12.9	12	6	49 43.99	1.216	22 20 59.5	1.33	21 27.2
3	6	33 56.06	1.389	22 35 3.3	0.95	23 9.5	13	6	50 13.07	1.207	22 20 27.6	1.33	21 23.8
4	6	34 29.36	1.386	22 34 40.2	0.97	23 6.1	14	6	50 41.93	1.198	22 19 55.6	1.34	21 20.3
5	6	35 2.58	1.383	22 34 16.6	0.99	23 2.8	15	6	51 10.58	1.189	22 19 23.5	1.34	21 16.9
6	6	35 35.73	+1.379	+22 33 52.7	-1.01	22 59.4	16	6	51 39.00	+1.179	+22 18 51.3	-1.34	21 13.4
7	6	36 8.79	1.376	22 33 28.3	1.02	22 56.0	17	6	52 7.19	1.170	22 18 19.0	1.35	21 9.9
8	6	36 41.76	1.372	22 33 3.5	1.04	22 52.6	18	6	52 35.15	1.160	22 17 46.7	1.35	21 6.4
9	6	37 14.63	1.368	22 32 38.3	1.06	22 49.2	19	6	53 2.87	1.150	22 17 14.3	1.35	21 3.0
10	6	37 47.41	1.364	22 32 12.8	1.07	22 45.8	20	6	53 30.35	1.140	22 16 41.9	1.35	20 59.5
1	6	38 20.08	+1.359	+22 31 46.9	-1.09	22 42.4	21	6	53 57.58	+1.130	+22 16 9.5	-1.35	20 56.0
2	6	38 52.64	1.354	22 31 20.6	1.10	22 39.0	22	6	54 24.57	1.119	22 15 37.1	1.35	20 52.5
3	6	39 25.10	1.350	22 30 53.9	1.12	22 35.6	23	6	54 51.30	1.108	22 15 4.7	1.35	20 49.0
4	6	39 57.43	1.345	22 30 26.9	1.13	22 32.2	24	6	55 17.77	1.098	22 14 32.4	1.35	20 45.5
5	6	40 29.64	1.340	22 29 59.5	1.15	22 28.8	25	6	55 43.98	1.087	22 14 0.0	1.35	20 42.0
6	6	41 1.73	+1.334	+22 29 31.8	-1.16	22 25.4	26	6	56 9.93	+1.076	+22 13 27.7	-1.34	20 38.5
7	6	41 33.69	1.329	22 29 3.8	1.17	22 22.0	27	6	56 35.61	1.064	22 12 55.5	1.34	20 35.0
8	6	42 5.52	1.323	22 28 35.5	1.19	22 18.6	28	6	57 1.01	1.053	22 12 23.4	1.34	20 31.5
9	6	42 37.22	1.318	22 28 6.9	1.20	22 15.2	29	6	57 26.14	1.041	22 11 51.4	1.33	20 28.0
10	6	43 8.77	1.312	22 27 37.9	1.21	22 11.8	30	6	57 50.98	1.029	22 11 19.5	1.33	20 24.5
1	6	43 40.18	+1.306	+22 27 8.7	-1.22	22 8.4	31	6	58 15.53	+1.017	+22 10 47.7	-1.32	20 20.9
2	6	44 11.44	+1.299	+22 26 39.2	-1.24	22 5.0	32	6	58 39.79	+1.005	+22 10 16.0	-1.32	20 17.4
Day of the Month.					Day of the Month.								
4th.					5th.								
12th.					13th.								
20th.					21st.								
28th.					29th.								
Semidiameter . . .					Semidiameter . . .								
Horizontal Parallax					Horizontal Parallax								

NOTE.—The sign + prefixed to the hourly change of declination indicates that north declinations are increasing; the sign - indicates that north declinations are decreasing.

GREENWICH MEAN TIME.

SEPTEMBER.						OCTOBER.						
Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.	Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Miles	
	Noon.	Noon.	Noon.	Noon.			Noon.	Noon.	Noon.	Noon.		
	h m s	s	° ' "	"	h m		h m s	s	° ' "	"	h	
1	6 58 39.79	+1.005	+22 10 16.0	-1.32	20 17.4	1	7 8 7.98	+0.548	+21 56 54.4	-0.82	18	
2	6 59 3.75	0.992	22 9 44.6	1.31	20 13.9	2	7 8 20.93	0.530	21 56 35.2	0.79	18	
3	6 59 27.40	0.979	22 9 13.3	1.30	20 10.3	3	7 8 33.44	0.512	21 56 16.5	0.76	18	
4	6 59 50.75	0.966	22 8 42.2	1.29	20 6.8	4	7 8 45.52	0.494	21 55 58.5	0.74	18	
5	7 0 13.78	0.953	22 8 11.3	1.28	20 3.2	5	7 8 57.17	0.476	21 55 41.2	0.71	18	
6	7 0 36.50	+0.940	+22 7 40.6	-1.27	19 59.6	6	7 9 8.38	+0.458	+21 55 24.5	-0.68	18	
7	7 0 58.89	0.926	22 7 10.1	1.26	19 56.1	7	7 9 19.14	0.439	21 55 8.6	0.65	18	
8	7 1 20.95	0.912	22 6 40.0	1.25	19 52.5	8	7 9 29.45	0.420	21 54 53.3	0.62	18	
9	7 1 42.68	0.898	22 6 10.1	1.24	19 48.9	9	7 9 39.32	0.402	21 54 38.8	0.59	17	
10	7 2 4.07	0.884	22 5 40.5	1.23	19 45.4	10	7 9 48.73	0.383	21 54 25.0	0.56	17	
11	7 2 25.12	+0.870	+22 5 11.2	-1.21	19 41.8	11	7 9 57.68	+0.364	+21 54 11.9	-0.53	17	
12	7 2 45.82	0.855	22 4 42.2	1.20	19 38.2	12	7 10 6.18	0.345	21 53 59.6	0.50	17	
13	7 3 6.17	0.840	22 4 13.6	1.19	19 34.6	13	7 10 14.22	0.325	21 53 48.0	0.47	17	
14	7 3 26.17	0.826	22 3 45.3	1.17	19 31.0	14	7 10 21.80	0.306	21 53 37.2	0.43	17	
15	7 3 45.80	0.811	22 3 17.4	1.15	19 27.4	15	7 10 28.91	0.287	21 53 27.2	0.40	17	
16	7 4 5.07	+0.795	+22 2 50.0	-1.14	19 23.7	16	7 10 35.55	+0.267	+21 53 18.0	-0.37	17	
17	7 4 23.98	0.780	22 2 22.9	1.12	19 20.1	17	7 10 41.73	0.248	21 53 9.5	0.34	17	
18	7 4 42.51	0.764	22 1 56.2	1.10	19 16.5	18	7 10 47.44	0.228	21 53 1.9	0.30	17	
19	7 5 0.67	0.749	22 1 30.0	1.08	19 12.9	19	7 10 52.68	0.209	21 52 55.0	0.27	17	
20	7 5 18.44	0.733	22 1 4.2	1.06	19 9.2	20	7 10 57.45	0.189	21 52 49.0	0.23	17	
21	7 5 35.84	+0.717	+22 0 38.9	-1.04	19 5.6	21	7 11 1.75	+0.169	+21 52 43.7	-0.20	17	
22	7 5 52.85	0.701	22 0 14.1	1.02	19 1.9	22	7 11 5.58	0.150	21 52 39.3	0.17	17	
23	7 6 9.47	0.684	21 59 49.8	1.00	18 58.2	23	7 11 8.93	0.130	21 52 35.7	0.13	17	
24	7 6 25.70	0.668	21 59 26.0	0.98	18 54.6	24	7 11 11.80	0.110	21 52 33.0	0.10	17	
25	7 6 41.54	0.651	21 59 2.6	0.96	18 50.9	25	7 11 14.20	0.090	21 52 31.0	0.06	16	
26	7 6 56.97	+0.635	+21 58 39.8	-0.94	18 47.2	26	7 11 16.12	+0.070	+21 52 29.9	-0.03	16	
27	7 7 12.00	0.618	21 58 17.6	0.91	18 43.5	27	7 11 17.56	0.050	21 52 29.7	+0.01	16	
28	7 7 26.62	0.601	21 57 55.9	0.89	18 39.8	28	7 11 18.52	0.030	21 52 30.3	0.04	16	
29	7 7 40.82	0.583	21 57 34.8	0.87	18 36.1	29	7 11 18.99	+0.010	21 52 31.7	0.08	16	
30	7 7 54.61	0.566	21 57 14.3	0.84	18 32.4	30	7 11 18.99	-0.010	21 52 34.0	0.11	16	
31	7 8 7.98	+0.548	+21 56 54.4	-0.82	18 28.7	31	7 11 18.50	-0.030	+21 52 37.2	+0.15	16	
32	7 8 20.93	+0.530	+21 56 35.2	-0.79	18 25.0	32	7 11 17.53	-0.050	+21 52 41.2	+0.18	16	
Day of the Month.						Day of the Month.						
6th.						8th.						
14th.						10th.						
22d.						12th.						
30th.						14th.						
Semidiameter . . .						Semidiameter						
Horizontal Parallax						Horizontal Parallax . . .						
8.16						8.61						
0.93						0.98						
8.26						8.74						
0.94						0.99						
8.37												
0.95												
8.49												
0.96												

NOTE.—The sign + indicates north declinations.

GREENWICH MEAN TIME.

NOVEMBER.						DECEMBER.					
Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.	Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.
	Noon.	Noon.	Noon.	Noon.			Noon.	Noon.	Noon.	Noon.	
	h m s	s	° ' "	"	h m		h m s	s	° ' "	"	h m
1	7 11 17.53	-0.090	+21 52 41.2	+0.18	16 29.8	1	7 7 13.66	-0.603	+22 0 58.2	+1.14	14 27.7
2	7 11 16.08	0.071	21 52 46.0	0.22	16 25.8	2	7 6 59.01	0.618	22 1 25.8	1.16	14 23.5
3	7 11 14.15	0.091	21 52 51.8	0.26	16 21.9	3	7 6 43.99	0.633	22 1 53.9	1.18	14 19.3
4	7 11 11.73	0.111	21 52 58.3	0.29	16 17.9	4	7 6 28.62	0.648	22 2 22.6	1.21	14 15.1
5	7 11 8.83	0.131	21 53 5.8	0.33	16 13.9	5	7 6 12.90	0.662	22 2 51.8	1.23	14 10.9
6	7 11 5.45	-0.151	+21 53 14.1	+0.36	16 9.9	6	7 5 56.84	-0.676	+22 3 21.5	+1.25	14 6.7
7	7 11 1.59	0.171	21 53 23.2	0.40	16 5.9	7	7 5 40.46	0.690	22 3 51.7	1.27	14 2.5
8	7 10 57.25	0.191	21 53 33.2	0.43	16 1.9	8	7 5 23.75	0.703	22 4 22.3	1.29	13 58.3
9	7 10 52.44	0.210	21 53 44.1	0.47	15 57.9	9	7 5 6.74	0.715	22 4 53.5	1.31	13 54.1
10	7 10 47.16	0.230	21 53 55.8	0.50	15 53.9	10	7 4 49.42	0.728	22 5 25.0	1.32	13 49.9
11	7 10 41.40	-0.249	+21 54 8.3	+0.54	15 49.8	11	7 4 31.82	-0.739	+22 5 56.9	+1.34	13 45.6
12	7 10 35.18	0.269	21 54 21.6	0.57	15 45.8	12	7 4 13.94	0.751	22 6 29.2	1.35	13 41.4
13	7 10 28.50	0.288	21 54 35.8	0.61	15 41.7	13	7 3 55.78	0.762	22 7 1.9	1.37	13 37.2
14	7 10 21.36	0.307	21 54 50.8	0.64	15 37.7	14	7 3 37.37	0.772	22 7 34.9	1.38	13 32.9
15	7 10 13.76	0.326	21 55 6.6	0.67	15 33.6	15	7 3 18.71	0.783	22 8 8.3	1.40	13 28.7
16	7 10 5.70	-0.345	+21 55 23.1	+0.71	15 29.6	16	7 2 59.81	-0.792	+22 8 41.9	+1.41	13 24.4
17	7 9 57.20	0.363	21 55 40.5	0.74	15 25.5	17	7 2 40.68	0.802	22 9 15.8	1.42	13 20.2
18	7 9 48.26	0.382	21 55 58.6	0.77	15 21.4	18	7 2 21.34	0.810	22 9 49.9	1.43	13 15.9
19	7 9 38.88	0.400	21 56 17.4	0.80	15 17.3	19	7 2 1.79	0.819	22 10 24.3	1.44	13 11.7
20	7 9 29.06	0.418	21 56 37.0	0.83	15 13.2	20	7 1 42.04	0.827	22 10 58.9	1.45	13 7.4
21	7 9 18.81	-0.436	+21 56 57.4	+0.86	15 9.1	21	7 1 22.11	-0.834	+22 11 33.7	+1.45	13 3.1
22	7 9 8.13	0.454	21 57 18.4	0.89	15 5.0	22	7 1 2.00	0.841	22 12 8.6	1.46	12 58.9
23	7 8 57.03	0.471	21 57 40.2	0.92	15 0.9	23	7 0 41.73	0.848	22 12 43.7	1.47	12 54.6
24	7 8 45.51	0.489	21 58 2.6	0.95	14 56.7	24	7 0 21.31	0.854	22 13 19.0	1.47	12 50.3
25	7 8 33.58	0.506	21 58 25.8	0.98	14 52.6	25	7 0 0.75	0.860	22 13 54.3	1.47	12 46.1
26	7 8 21.25	-0.522	+21 58 49.6	+1.01	14 48.5	26	6 59 40.05	-0.865	+22 14 29.8	+1.48	12 41.8
27	7 8 8.51	0.539	21 59 14.0	1.03	14 44.3	27	6 59 19.24	0.869	22 15 5.3	1.48	12 37.5
28	7 7 55.37	0.555	21 59 39.2	1.06	14 40.2	28	6 58 58.32	0.874	22 15 40.8	1.48	12 33.2
29	7 7 41.85	0.572	22 0 4.9	1.09	14 36.0	29	6 58 37.31	0.877	22 16 16.5	1.48	12 28.9
30	7 7 27.94	0.587	22 0 31.3	1.11	14 31.8	30	6 58 16.21	0.881	22 16 52.1	1.48	12 24.7
31	7 7 13.66	-0.603	+22 0 58.2	+1.14	14 27.7	31	6 57 55.05	-0.883	+22 17 27.7	+1.48	12 20.4
32	7 6 59.00	-0.618	+22 1 25.8	+1.16	14 23.5	32	6 57 33.82	-0.885	+22 18 3.3	+1.48	12 16.1
Day of the Month.						Day of Month.					
1st.						3d.					
9th.						11th.					
17th.						19th.					
25th.						27th.					
25th.						25th.					
Semidiameter . . .						Semidiam.					
Horizontal Parallax						Hor. Par.					
9.00						9.45					
9.12						9.53					
9.24						9.59					
9.35						9.62					
1.02						1.07					
1.04						1.08					
1.05						1.09					
1.06						1.09					
1.09						1.09					

NOTE.—The sign + prefixed to the hourly change of declination indicates that north declinations are increasing; the sign - indicates that north declinations are decreasing.

GREENWICH MEAN TIME.

Month and Day.	Apparent Right Ascension.	Var. of R. A. for 1 Day.	Apparent Declination.	Var. of Decl. for 1 Day.	Merid- ian Pas- sage.	Month and Day.	Apparent Right Ascension.	Var. of R. A. for 1 Day.	Apparent Declination.	Var. of Decl. for 1 Day.	Merid- ian Pas- sage.
	Noon.	Noon.	Noon.	Noon.			Noon.	Noon.	Noon.	Noon.	
	h m s	s	" ' "	" ' "	h m		h m s	s	" ' "	" ' "	h m
Jan.	0 20 49.49.31	+12.659	-18 23 56.8	+50.97	2 13.2	July 3	21 10 35.83	-7.262	-17 1 11.4	-33.66	14 26.4
	4 20 50.40.67	13.010	18 20 29.8	52.48	1 58.3		7 21 10 5.80	7.744	17 3 30.0	35.57	14 10.2
	8 20 51 33.33	13.315	18 16 57.1	53.86	1 43.5		11 21 9 33.94	8.177	17 5 55.7	37.26	13 54.0
	12 20 52 27.13	13.577	18 13 19.3	55.06	1 28.6		15 21 9 0.45	8.557	17 8 27.7	38.68	13 37.7
	16 20 53 21.89	13.791	18 9 37.0	56.06	1 13.8		19 21 8 25.56	8.879	17 11 4.8	39.80	13 21.4
	20 20 54 17.40	+13.951	-18 5 51.1	+56.86	0 59.0		23 21 7 49.50	-9.142	-17 13 45.9	-40.69	13 5.0
	24 20 55 13.44	14.059	18 2 2.4	57.46	0 44.2		27 21 7 12.51	9.346	17 16 30.0	41.30	12 48.7
	28 20 56 9.81	14.120	17 58 11.6	57.87	0 29.4		31 21 6 34.81	9.494	17 19 16.0	41.65	12 32.3
Feb.	1 20 57 6.34	14.137	17 54 19.6	58.11	0 14.6	Aug. 4	21 5 56.64	9.582	17 22 2.9	41.76	12 16.0
	5 20 58 2.85	14.110	17 50 27.1	58.15	23 56.1		8 21 5 18.24	9.606	17 24 49.7	41.57	11 59.6
	9 20 58 59.16	+14.037	-17 46 34.8	+57.98	23 41.4		12 21 4 39.88	-9.563	-17 27 35.1	-41.09	11 43.3
	13 20 59 55.08	13.912	17 42 43.5	57.62	23 26.5		16 21 4 1.82	9.456	17 30 18.0	40.33	11 26.9
	17 21 0 50.39	13.738	17 38 54.0	57.05	23 11.7		20 21 3 24.32	9.284	17 32 57.4	39.79	11 10.6
	21 21 1 44.92	13.515	17 35 7.4	56.27	22 56.9		24 21 2 47.63	9.051	17 35 32.0	38.00	10 54.2
	25 21 2 38.46	13.249	17 31 24.2	55.28	22 42.0		28 21 2 11.99	8.761	17 38 1.2	36.53	10 37.9
Mar.	1 21 3 30.86	+12.944	-17 27 45.4	+54.08	22 27.1	Sept. 1	21 1 37.62	-8.415	-17 40 24.0	-34.81	10 21.6
	5 21 4 21.96	12.601	17 24 11.7	52.73	22 12.3		5 21 1 4.75	8.011	17 42 39.4	32.86	10 5.4
	9 21 5 11.61	12.216	17 20 43.8	51.18	21 57.4		9 21 0 33.61	7.549	17 44 46.6	30.70	9 49.1
	13 21 5 59.63	11.787	17 17 22.5	49.43	21 42.5		13 21 0 4.43	7.032	17 46 44.7	28.32	9 32.9
	17 21 6 45.85	11.316	17 14 8.6	47.48	21 27.5		17 20 59 37.42	6.466	17 48 32.9	25.75	9 16.7
	21 21 7 30.11	+10.807	-17 11 2.9	+45.34	21 12.5		21 20 59 12.76	-5.858	-17 50 10.5	-23.05	9 0.5
	25 21 8 12.26	10.263	17 8 6.1	43.04	20 57.5		25 20 58 50.61	5.213	17 51 37.1	20.22	8 44.4
	29 21 8 52.17	9.690	17 5 18.8	40.58	20 42.4		29 20 58 31.10	4.532	17 52 52.1	17.26	8 28.3
Apr.	2 21 9 29.73	9.090	17 2 41.6	37.97	20 27.3	Oct. 3	20 58 14.39	3.816	17 53 55.0	14.18	8 12.4
	6 21 10 4.84	8.460	17 0 15.2	35.22	20 12.1		7 20 58 0.61	3.068	17 54 45.4	10.99	7 56.5
	10 21 10 37.37	+7.797	-16 58 0.0	+32.34	19 56.9		11 20 57 49.88	-2.295	-17 55 22.8	-7.70	7 40.6
	14 21 11 7.18	7.105	16 55 56.7	29.30	19 41.7		15 20 57 42.28	1.501	17 55 46.9	4.36	7 24.7
	18 21 11 34.18	6.392	16 54 5.8	26.14	19 26.4		19 20 57 37.89	-0.693	17 55 57.6	-0.98	7 8.9
	22 21 11 58.29	5.661	16 52 27.7	22.90	19 11.1		23 20 57 36.74	+0.122	17 55 54.7	+2.42	6 53.2
	26 21 12 19.45	4.916	16 51 2.7	19.57	18 55.7		27 20 57 38.87	0.942	17 55 38.2	5.83	6 37.5
	30 21 12 37.60	+4.158	-16 49 51.2	+16.18	18 40.2		31 20 57 44.28	+1.765	-17 55 8.0	+9.26	6 21.9
May	4 21 12 52.70	3.388	16 48 53.3	12.74	18 24.7	Nov. 4	20 57 52.99	2.590	17 54 24.1	12.68	6 6.3
	8 21 13 4.69	2.608	16 48 9.3	9.25	18 9.2		8 20 58 5.00	3.413	17 53 26.6	16.08	5 50.8
	12 21 13 13.55	1.820	16 47 39.3	5.73	17 53.6		12 20 58 20.28	4.224	17 52 15.5	19.46	5 35.3
	16 21 13 19.24	1.008	16 47 23.5	+2.19	17 38.0		16 20 58 38.77	5.018	17 50 51.0	22.77	5 19.9
	20 21 13 21.77	+0.238	-16 47 21.8	-1.33	17 22.3		20 20 59 0.40	+5.792	-17 49 13.5	+25.98	5 4.5
	24 21 13 21.15	-0.545	16 47 34.1	4.81	17 6.5		24 20 59 25.08	6.543	17 47 23.4	29.11	4 49.2
	28 21 13 17.42	1.316	16 48 0.2	8.22	16 50.7		28 20 59 52.72	7.274	17 45 20.9	32.10	4 33.9
June	1 21 13 10.64	2.072	16 48 39.7	11.56	16 34.9	Dec. 2	21 0 23.24	7.983	17 43 6.2	35.14	4 18.7
	5 21 13 0.86	2.818	16 49 32.5	14.83	16 19.0		6 21 0 56.54	8.662	17 40 39.8	38.02	4 3.5
	9 21 12 48.12	-3.548	-16 50 38.3	-18.01	16 3.0		10 21 1 32.48	+9.305	-17 38 2.2	+40.77	3 48.4
	13 21 12 32.51	4.251	16 51 56.5	21.05	15 47.0		14 21 2 10.93	9.912	17 35 13.8	43.38	3 33.3
	17 21 12 14.15	4.925	16 53 26.5	23.94	15 31.0		18 21 2 51.73	10.478	17 32 15.3	45.84	3 18.3
	21 21 11 53.16	5.566	16 55 7.8	26.66	15 14.9		22 21 3 34.71	11.005	17 29 7.3	48.14	3 3.3
	25 21 11 20.67	6.172	16 56 59.5	29.18	14 58.8		26 21 4 19.72	11.495	17 25 50.4	50.30	2 48.3
	29 21 11 3.84	-6.737	-16 59 1.0	-31.57	14 42.6		30 21 5 6.62	+11.948	-17 22 25.2	+52.32	2 33.3
July 3	21 10 35.83	-7.262	-17 1 11.4	-33.66	14 26.4		34 21 5 55.25	+12.356	-17 18 52.1	+54.15	2 18.4

Least semidiameter.
Greatest semidiameter.

February 2. 1".61
August 6. 1".77

Least horizontal parallax. February 2. 0".42
Greatest horizontal parallax. August 6. 0".47

GREENWICH MEAN TIME.

Month and Day.	Apparent Right As- cension.			Var. of R. A. for 1 Day.		Apparent Declination.		Var. of Decl. for 1 Day.		Merid- ian Pas- sage.	Month and Day.	Apparent Right As- cension.			Var. of R. A. for 1 Day.		Apparent Declination.		Var. of Decl. for 1 Day.		Merid- ian Pas- sage.
	h m s	s	" "	" "	h m	h m s	s	" "	" "			h m	h m s	s	" "	" "	h m	s	" "	" "	
Jan. 1	8 6 45.63	-6.477	+19 52 26.8	+19.94	13 28.2	July 3	8 6 0.83	+8.861	+19 58 5.2	-25.70	1 24.1	7	8 6 36.57	9.005	19 56 21.2	26.30	1 8.9				
4	8 6 19.29	6.682	19 53 47.8	20.55	13 12.0	7	8 6 36.57	9.005	19 56 21.2	26.30	1 8.9	11	8 7 12.83	9.118	19 54 35.0	26.81	0 53.8				
8	8 5 52.22	6.846	19 55 10.9	21.02	12 55.9	11	8 7 12.83	9.118	19 54 35.0	26.81	0 53.8	15	8 7 49.47	9.197	19 52 46.9	27.22	0 38.7				
12	8 5 24.58	6.965	19 56 35.7	21.36	12 39.7	15	8 7 49.47	9.197	19 52 46.9	27.22	0 38.7	19	8 8 26.37	9.246	19 50 57.4	27.53	0 23.6				
16	8 4 56.57	7.034	19 58 1.6	21.56	12 23.5	19	8 8 26.37	9.246	19 50 57.4	27.53	0 23.6	23	8 9 3.39	+9.261	+19 49 6.8	-27.75	0 8.5				
20	8 4 28.38	-7.055	+19 59 28.0	+21.61	12 7.3	23	8 9 3.39	+9.261	+19 49 6.8	-27.75	0 8.5	27	8 9 40.41	9.246	19 47 15.6	27.88	23 49.6				
24	8 4 0.19	7.030	20 0 54.3	21.51	11 51.1	27	8 9 40.41	9.246	19 47 15.6	27.88	23 49.6	31	8 10 17.32	9.203	19 45 24.0	27.91	23 34.5				
28	8 3 32.20	6.960	20 2 19.9	21.29	11 34.9	31	8 10 17.32	9.203	19 45 24.0	27.91	23 34.5	Aug. 4	8 10 53.99	9.130	19 43 32.4	27.86	23 19.4				
Feb. 1	8 3 4.57	6.845	20 3 44.4	20.94	11 18.7	Aug. 4	8 10 53.99	9.130	19 43 32.4	27.86	23 19.4	8	8 11 30.31	9.024	19 41 41.3	27.71	23 4.2				
5	8 2 37.50	6.687	20 5 7.3	20.47	11 2.6	8	8 11 30.31	9.024	19 41 41.3	27.71	23 4.2	12	8 12 6.14	+8.886	+19 39 51.0	-27.43	22 49.1				
9	8 2 11.13	-6.487	+20 6 28.0	+19.86	10 46.4	12	8 12 6.14	+8.886	+19 39 51.0	-27.43	22 49.1	16	8 12 41.36	8.715	19 38 2.0	27.06	22 33.9				
13	8 1 45.65	6.243	20 7 46.0	19.14	10 30.2	16	8 12 41.36	8.715	19 38 2.0	27.06	22 33.9	20	8 13 15.83	8.514	19 36 14.7	26.57	22 18.8				
17	8 1 21.24	5.957	20 9 0.9	18.31	10 14.1	20	8 13 15.83	8.514	19 36 14.7	26.57	22 18.8	24	8 13 49.44	8.285	19 34 29.6	25.92	22 3.6				
21	8 0 58.05	5.631	20 10 12.2	17.36	9 58.0	24	8 13 49.44	8.285	19 34 29.6	25.92	22 3.6	28	8 14 22.07	8.029	19 32 47.0	25.79	21 48.4				
25	8 0 36.24	5.271	20 11 19.6	16.32	9 41.9	28	8 14 22.07	8.029	19 32 47.0	25.79	21 48.4	Sept. 1	8 14 53.64	+7.747	+19 31 7.4	-24.53	21 33.2				
Mar. 1	8 0 15.93	-4.880	+20 12 22.7	+15.19	9 25.9	Sept. 1	8 14 53.64	+7.747	+19 31 7.4	-24.53	21 33.2	5	8 15 24.01	7.434	19 29 31.0	23.66	21 18.0				
5	7 59 57.24	4.460	20 13 21.0	13.98	9 9.8	5	8 15 24.01	7.434	19 29 31.0	23.66	21 18.0	9	8 15 53.07	7.092	19 27 58.3	22.67	21 2.7				
9	7 59 40.29	4.013	20 14 14.4	12.72	8 53.8	9	8 15 53.07	7.092	19 27 58.3	22.67	21 2.7	13	8 16 20.70	6.721	19 26 29.8	21.58	20 47.4				
13	7 59 25.17	3.540	20 15 2.6	11.38	8 37.8	13	8 16 20.70	6.721	19 26 29.8	21.58	20 47.4	17	8 16 46.81	6.326	19 25 5.8	20.38	20 32.1				
17	7 59 12.00	3.041	20 15 45.3	9.96	8 21.9	17	8 16 46.81	6.326	19 25 5.8	20.38	20 32.1	21	8 17 11.29	+5.909	+19 23 46.8	-19.10	20 16.8				
21	7 59 0.86	-2.524	+20 16 22.3	+8.50	8 6.0	21	8 17 11.29	+5.909	+19 23 46.8	-19.10	20 16.8	25	8 17 34.06	5.473	19 22 33.1	17.77	20 1.5				
25	7 58 51.82	1.994	20 16 53.3	7.01	7 50.1	25	8 17 34.06	5.473	19 22 33.1	17.77	20 1.5	29	8 17 55.05	5.016	19 21 24.8	16.35	19 46.1				
29	7 58 44.93	1.453	20 17 18.3	5.49	7 34.3	29	8 17 55.05	5.016	19 21 24.8	16.35	19 46.1	Oct. 3	8 18 14.16	4.536	19 20 22.5	14.84	19 30.6				
Apr. 1	7 58 40.21	0.905	20 17 37.2	3.94	7 18.5	Oct. 3	8 18 14.16	4.536	19 20 22.5	14.84	19 30.6	7	8 18 31.31	4.037	19 19 26.3	13.73	19 15.2				
5	7 58 37.70	-0.350	20 17 49.8	2.37	7 2.7	7	8 18 31.31	4.037	19 19 26.3	13.73	19 15.2	11	8 18 46.43	+3.519	+19 18 36.7	-11.57	18 59.7				
9	7 58 37.42	+0.211	+20 17 56.1	+0.79	6 47.0	11	8 18 46.43	+3.519	+19 18 36.7	-11.57	18 59.7	15	8 18 59.45	2.988	19 17 53.9	9.84	18 44.2				
13	7 58 39.39	0.774	20 17 56.1	-0.80	6 31.3	15	8 18 59.45	2.988	19 17 53.9	9.84	18 44.2	19	8 19 10.32	2.447	19 17 18.1	8.08	18 28.6				
17	7 58 43.60	1.335	20 17 49.7	2.39	6 15.6	19	8 19 10.32	2.447	19 17 18.1	8.08	18 28.6	23	8 19 19.02	1.900	19 16 49.3	6.28	18 13.1				
21	7 58 50.06	1.890	20 17 37.0	3.98	6 0.0	23	8 19 19.02	1.900	19 16 49.3	6.28	18 13.1	27	8 19 25.52	1.344	19 16 27.9	4.45	17 57.4				
25	7 58 58.72	2.435	20 17 17.9	5.55	5 44.4	27	8 19 25.52	1.344	19 16 27.9	4.45	17 57.4	31	8 19 29.78	+0.782	+19 16 13.7	-2.60	17 41.8				
30	7 59 9.53	-2.970	+20 16 52.6	-7.09	5 28.9	31	8 19 29.78	+0.782	+19 16 13.7	-2.60	17 41.8	Nov. 4	8 19 31.77	+0.214	19 16 7.1	-0.71	17 26.1				
May 1	7 59 22.46	3.494	20 16 21.2	8.60	5 13.4	Nov. 4	8 19 31.77	+0.214	19 16 7.1	-0.71	17 26.1	8	8 19 31.50	-0.353	19 16 8.1	+1.18	17 10.3				
5	7 59 37.46	4.006	20 15 43.8	10.09	4 57.9	8	8 19 31.50	-0.353	19 16 8.1	+1.18	17 10.3	12	8 19 28.96	0.911	19 16 16.5	3.05	16 54.6				
9	7 59 54.49	4.504	20 15 0.5	11.57	4 42.4	12	8 19 28.96	0.911	19 16 16.5	3.05	16 54.6	16	8 19 24.21	1.463	19 16 32.4	4.88	16 38.7				
13	8 0 13.47	4.984	20 14 11.3	13.01	4 27.0	16	8 19 24.21	1.463	19 16 32.4	4.88	16 38.7	20	8 19 17.27	-2.005	+19 16 55.5	+6.68	16 22.9				
17	8 0 34.33	+5.443	+20 13 16.5	-14.40	4 11.7	20	8 19 17.27	-2.005	+19 16 55.5	+6.68	16 22.9	24	8 19 8.19	2.535	19 17 25.7	8.45	16 7.0				
21	8 0 56.98	5.879	20 12 16.2	15.72	3 56.3	24	8 19 8.19	2.535	19 17 25.7	8.45	16 7.0	28	8 18 57.01	3.051	19 18 3.0	10.17	15 51.1				
25	8 1 21.33	6.292	20 11 10.8	16.99	3 41.0	28	8 18 57.01	3.051	19 18 3.0	10.17	15 51.1	Dec. 2	8 18 43.81	3.548	19 18 47.0	11.81	15 35.1				
June 1	8 1 47.28	6.682	20 10 0.3	18.22	3 25.7	Dec. 2	8 18 43.81	3.548	19 18 47.0	11.81	15 35.1	6	8 18 28.66	4.023	19 19 37.4	13.30	15 19.2				
5	8 2 14.76	7.051	20 8 45.1	19.40	3 10.4	6	8 18 28.66	4.023	19 19 37.4	13.30	15 19.2	10	8 18 11.66	-4.473	+19 20 34.0	+14.88	15 3.1				
9	8 2 43.66	+7.395	+20 7 25.2	-20.52	2 55.2	10	8 18 11.66	-4.473	+19 20 34.0	+14.88	15 3.1	14	8 17 52.92	4.891	19 21 36.2	16.24	14 47.1				
13	8 3 13.89	7.713	20 6 1.0	21.58	2 39.9	14	8 17 52.92	4.891	19 21 36.2	16.24	14 47.1	18	8 17 32.57	5.278	19 22 43.8	17.50	14 31.0				
17	8 3 45.33	8.002	20 4 32.7	22.56	2 24.7	18	8 17 32.57	5.278	19 22 43.8	17.50	14 31.0	22	8 17 10.74	5.632	19 23 56.1	18.65	14 14.9				
21	8 4 17.86	8.259	20 3 0.7	23.46	2 9.6	22	8 17 10.74	5.632	19 23 56.1	18.65	14 14.9	26	8 16 47.57	5.948	19 25 12.8	19.68	13 58.8				
25	8 4 51.36	8.487	20 1 25.2	24.28	1 54.4	26	8 16 47.57	5.948	19 25 12.8	19.68	13 58.8	30	8 16 23.21	-6.229	+19 26 33.4	+20.58	13 42.7				
29	8 5 25.72	+8.689	+19 59 46.6	-25.02	1 39.2	30	8 16 23.21	-6.229	+19 26 33.4	+20.58	13 42.7	34	8 15 57.79	-6.471	+19 27 57.3	+21.35	13 26.5				
July 3	8 6 0.83	+8.861	+19 58 5.2	-25.70	1 24.1	34	8 15 57.79	-6.471	+19 27 57.3	+21.35	13 26.5										

Greatest semidiameter,
Least semidiameter,
3381°—1915—12

January 19, 1' 33.33
July 23, 1' 2.45

Greatest horizontal parallax, January 19, 0' 30.30
Least horizontal parallax, July 23, 0' 28.28

[Eph 15]

MERCURY.

GREENWICH MEAN NOON.

Date.	Heliocentric Longitude, Mean Equinox of Date.			Daily Motion.		Reduction to Orbit.		Heliocentric Latitude.			Daily Motion.		Logarithm of Radius Vector.		Logarithm of Ear	
															At Date.	
Jan.	1	272 18 49.5	2 48 49.6	+12 52.3	-4 57 48.5	-14 33.3	9.664 4806	0.158 6808								
	2	275 8 21.0	2 50 15.5	12 48.3	5 12 3.2	13 55.7	9.662 8071	0.158 4642								
	3	277 59 25.0	2 51 54.6	12 36.7	5 25 39.2	13 16.0	9.660 8699	0.158 0757								
	4	280 52 14.8	2 53 47.4	12 17.4	5 38 34.3	12 33.8	9.658 6679	0.157 5128								
	5	283 47 4.4	2 55 54.1	11 50.3	5 50 45.8	11 48.9	9.656 2001	0.156 7721								
	6	286 44 7.8	2 58 15.2	+11 15.4	-6 2 11.0	-11 1.1	9.653 4657	0.155 8497								
	7	289 43 39.8	3 0 51.2	10 32.8	6 12 47.0	10 10.2	9.650 4638	0.154 7411								
	8	292 45 55.5	3 3 42.7	9 42.5	6 22 30.4	9 15.8	9.647 1935	0.153 4411								
	9	295 51 10.7	3 6 50.3	8 44.7	6 31 17.4	8 17.5	9.643 6545	0.151 9434								
	10	298 59 41.8	3 10 14.6	7 39.7	6 39 4.0	7 15.0	9.639 8467	0.150 2411								
	11	302 11 45.8	3 13 56.3	+6 27.9	-6 45 45.9	-6 7.9	9.635 7705	0.148 3270								
	12	305 27 40.4	3 17 56.0	5 9.7	6 51 18.1	4 55.7	9.631 4272	0.146 1918								
	13	308 47 44.0	3 22 14.4	3 45.7	6 55 35.4	3 37.9	9.626 8183	0.143 8261								
	14	312 12 15.6	3 26 52.2	2 16.8	6 58 31.9	2 14.0	9.621 9473	0.141 2199								
	15	315 41 35.1	3 31 50.1	+0 43.8	7 0 1.3	-0 43.7	9.616 8181	0.138 3611								
	16	319 16 2.9	3 37 9.0	-0 52.2	-6 59 57.0	+0 53.5	9.611 4367	0.135 2372								
	17	322 56 0.3	3 42 49.4	2 29.7	6 58 11.8	2 38.2	9.605 8107	0.131 8342								
	18	326 41 49.0	3 48 51.7	4 7.3	6 54 38.0	4 30.7	9.599 9502	0.128 1371								
	19	330 33 51.1	3 55 16.3	5 43.2	6 49 7.6	6 31.5	9.593 8680	0.124 1295								
	20	334 32 29.0	4 2 3.4	7 15.3	6 41 32.1	8 40.9	9.587 5798	0.119 7939								
	21	338 38 5.4	4 9 13.1	-8 41.5	-6 31 42.9	+10 58.9	9.581 1055	0.115 1113								
	22	342 51 2.5	4 16 44.8	9 59.2	6 19 31.4	13 25.5	9.574 4601	0.110 0617								
	23	347 11 42.0	4 24 37.8	11 5.8	6 4 49.1	16 0.5	9.567 6996	0.104 6237								
	24	351 40 24.8	4 32 59.9	11 58.6	5 47 27.9	18 43.1	9.560 8313	0.098 7747								
	25	356 17 29.8	4 41 22.0	12 34.7	5 27 20.6	21 32.4	9.553 9048	0.092 4921								
	26	1 3 13.9	4 50 8.5	-12 51.4	-5 4 21.4	+24 26.6	9.546 9674	0.085 7522								
	27	5 57 50.9	4 59 7.0	12 46.4	4 38 26.3	27 23.8	9.540 0737	0.078 5314								
	28	11 1 30.5	5 8 13.0	12 17.8	4 9 33.7	30 21.2	9.533 2852	0.070 8070								
	29	16 14 17.7	5 17 21.0	11 24.2	3 37 45.1	33 15.1	9.526 6707	0.062 5574								
	30	21 36 11.1	5 26 24.4	10 5.3	3 3 6.1	36 1.2	9.520 3060	0.053 7633								
Feb.	31	27 7 2.3	5 35 15.3	-8 22.1	-2 25 46.9	+38 34.7	9.514 2724	0.044 4094								
	1	32 46 34.5	5 43 44.9	6 16.8	1 46 2.8	40 50.0	9.508 6556	0.034 4854								
	2	38 34 21.7	5 51 43.5	3 53.1	1 4 14.9	42 41.2	9.503 5433	0.023 9872								
	3	44 29 47.7	5 59 0.7	-1 16.4	-0 20 50.2	44 7.7	9.499 0229	0.012 9197								
	4	50 32 5.7	6 5 25.8	+1 26.7	+0 23 38.8	44 49.0	9.495 1773	0.001 2983								
	5	56 40 18.4	6 10 48.3	+4 8.4	+1 8 34.6	+44 55.6	9.492 0820	9.989 1509								
	6	62 53 18.3	6 14 58.6	6 40.5	1 53 15.8	44 19.5	9.489 8012	9.976 5200								
	7	69 9 49.0	6 17 48.6	8 54.8	2 36 58.9	42 59.4	9.488 3840	9.963 4646								
	8	75 28 26.8	6 19 12.0	10 43.8	3 19 0.2	40 56.1	9.487 8619	9.950 0616								
	9	81 47 43.1	6 19 5.1	12 1.7	3 58 37.6	38 12.4	9.488 2467	9.936 4072								
	10	88 6 6.9	6 17 27.3	+12 44.4	+4 35 13.1	+34 53.2	9.489 5296	9.922 6162								
	11	94 22 8.1	6 14 20.7	12 50.1	5 8 14.3	31 5.1	9.491 6822	9.908 8231								
	12	100 34 20.2	6 9 50.3	12 19.7	5 37 16.0	26 55.4	9.494 6578	9.895 1799								
	13	106 41 23.1	6 4 3.7	11 16.0	6 2 0.6	22 32.2	9.498 3943	9.881 8525								
	14	112 42 5.4	5 57 10.7	9 43.6	6 22 18.5	18 3.4	9.502 8177	9.869 0182								
	15	118 35 26.0	5 49 22.2	+7 48.4	+6 38 7.8	+13 36.1	9.507 8458	9.856 8597								
	16	124 20 35.1	5 40 49.6	+5 37.0	+6 49 33.1	+9 16.4	9.513 3918	9.845 5587								

MERCURY.

GREENWICH MEAN NOON.

Date.	Heliocentric Longitude, Mean Equinox of Date.	Daily Motion.	Reduction to Orbit.	Heliocentric Latitude.	Daily Motion.	Logarithm of Radius Vec- tor.	Logarithm of Distance from Earth—	
							At Date.	At Inter- mediate Date.
Feb. 15	118 35 26.0	5 49 22.2	+ 7 48.4	+6 38 7.8	+13 36.1	9.507 8458	9.856 8597	9.851 0909
16	124 20 35.1	5 40 49.6	5 37.0	6 49 33.1	9 16.4	9.513 3918	9.845 5587	9.840 2844
17	129 56 54.4	5 31 44.5	3 16.0	6 56 44.7	5 9.4	9.519 3678	9.835 2881	9.830 5888
18	135 23 57.0	5 22 18.0	+ 0 51.7	6 59 57.3	+ 1 18.7	9.525 6877	9.826 2038	9.822 1487
19	140 41 26.6	5 12 40.1	- 1 30.2	6 59 28.3	- 2 13.3	9.532 2693	9.818 4372	9.815 0808
20	145 49 16.2	5 2 59.6	- 3 44.9	+6 55 37.4	- 5 25.1	9.539 0361	9.812 0886	9.809 4673
21	150 47 27.2	4 53 24.0	5 48.6	6 48 44.9	8 16.4	9.545 9181	9.807 2211	9.805 3517
22	155 36 7.7	4 43 59.5	7 38.6	6 39 11.2	10 47.6	9.552 8524	9.803 8584	9.802 7381
23	160 15 31.4	4 34 51.0	9 12.8	6 27 16.1	12 59.4	9.559 7837	9.801 9853	9.801 5923
24	164 45 56.3	4 26 2.3	10 30.3	6 13 18.5	14 52.9	9.566 6636	9.801 5497	9.801 8463
25	169 7 43.4	4 17 36.0	-11 30.6	+5 57 35.8	-16 29.7	9.573 4505	9.802 4693	9.803 4048
26	173 21 16.3	4 9 34.0	12 13.9	5 40 24.1	17 51.3	9.580 1091	9.804 6377	9.806 1522
27	177 26 59.8	4 1 57.3	12 40.7	5 21 57.7	18 59.2	9.586 6097	9.807 9318	9.809 9598
28	181 25 19.6	3 54 46.5	12 51.8	5 2 29.8	19 54.9	9.592 9274	9.812 2192	9.814 6930
Mar. 1	185 16 41.5	3 48 1.5	12 48.5	4 42 11.7	20 39.7	9.599 0420	9.817 3647	9.820 2177
2	189 1 31.3	3 41 42.2	-12 31.9	+4 21 13.6	-21 15.0	9.604 9371	9.823 2358	9.826 4039
3	192 40 14.4	3 35 48.0	12 3.4	3 59 44.5	21 42.0	9.610 5994	9.829 7072	9.833 1314
4	196 13 15.6	3 30 18.2	11 24.4	3 37 52.0	22 1.8	9.616 0185	9.836 6631	9.840 2895
5	199 40 58.8	3 25 11.9	10 36.2	3 15 42.9	22 15.4	9.621 1864	9.843 9988	9.847 7796
6	203 3 47.0	3 20 28.2	9 40.1	2 53 23.0	22 23.6	9.626 0969	9.851 6214	9.855 5146
7	206 22 2.5	3 16 6.3	- 8 37.4	+2 30 57.2	-22 27.1	9.630 7456	9.859 4502	9.863 4200
8	209 36 6.5	3 12 5.0	7 29.3	2 8 30.0	22 26.6	9.635 1293	9.867 4164	9.871 4322
9	212 46 19.1	3 8 23.5	6 16.9	1 46 5.1	22 22.6	9.639 2460	9.875 4610	9.879 4970
10	215 52 59.8	3 5 0.9	5 1.4	1 23 45.7	22 15.7	9.643 0945	9.883 5348	9.887 5696
11	218 56 27.0	3 1 56.4	3 43.6	1 1 34.5	22 6.2	9.646 6743	9.891 5971	9.895 6134
12	221 56 58.5	2 59 9.2	- 2 24.6	+0 39 34.0	-21 54.4	9.649 9854	9.899 6150	9.903 5987
13	224 54 51.1	2 56 38.6	- 1 5.2	+0 17 46.3	21 40.6	9.653 0280	9.907 5618	9.911 5018
14	227 50 20.9	2 54 23.8	+ 0 13.9	- 0 3 46.9	21 25.2	9.655 8029	9.915 4164	9.919 3036
15	230 43 43.6	2 52 24.2	1 31.9	0 25 3.8	21 8.3	9.658 3110	9.923 1618	9.926 9895
16	233 35 14.1	2 50 39.2	2 48.1	0 46 3.1	20 50.0	9.660 5532	9.930 7855	9.934 5486
17	236 25 6.7	2 49 8.3	+ 4 1.9	-1 6 43.5	-20 30.5	9.662 5305	9.938 2781	9.941 9730
18	239 13 35.3	2 47 51.2	5 12.7	1 27 3.7	20 9.8	9.664 2439	9.945 6327	9.949 2567
19	242 0 53.6	2 46 47.4	6 20.1	1 47 2.7	19 48.0	9.665 6944	9.952 8446	9.956 3962
20	244 47 14.6	2 45 56.7	7 23.5	2 6 39.4	19 25.1	9.666 8829	9.959 9111	9.963 3892
21	247 32 51.3	2 45 18.7	8 22.4	2 25 52.7	19 1.2	9.667 8099	9.966 8305	9.970 2350
22	250 17 56.2	2 44 53.2	+ 9 16.5	-2 44 41.5	-18 36.3	9.668 4761	9.973 6027	9.976 9337
23	253 2 41.9	2 44 40.0	10 5.3	3 3 4.9	18 10.3	9.668 8821	9.980 2282	9.983 4863
24	255 47 20.5	2 44 39.1	10 48.5	3 21 1.8	17 43.2	9.669 0280	9.986 7082	9.989 8941
25	258 32 4.3	2 44 50.5	11 25.7	3 38 31.0	17 15.0	9.668 9139	9.993 0444	9.996 1592
26	261 17 5.6	2 45 14.1	11 56.7	3 55 31.3	16 45.4	9.668 5397	9.999 2389	0.002 2837
27	264 2 36.6	2 45 49.9	+12 21.0	-4 12 1.3	-16 14.4	9.667 9053	0.005 2940	0.008 2699
28	266 48 49.5	2 46 38.0	12 38.6	4 27 59.7	15 42.1	9.667 0101	0.011 2118	0.014 1202
29	269 35 56.8	2 47 38.6	12 49.1	4 43 24.9	15 8.1	9.665 8536	0.016 9952	0.019 8370
30	272 24 11.0	2 48 52.0	12 52.3	4 58 15.3	14 32.3	9.664 4352	0.022 6460	0.025 4226
31	275 13 45.1	2 50 18.3	12 48.0	5 12 28.9	13 54.5	9.662 7540	0.028 1668	0.030 8790
Apr. 1	278 4 52.0	2 51 57.8	+12 36.2	-5 26 3.7	-13 14.6	9.660 8091	0.033 5594	0.036 2081
2	280 57 45.2	2 53 50.9	+12 16.7	-5 38 57.4	-12 32.3	9.658 5993	0.038 8253	0.041 4113

MERCURY.

GREENWICH MEAN NOON.

Date.	Heliocentric Longitude, Mean Equinox of Date.			Daily Motion.		Reduction to Orbit.		Heliocentric Latitude.			Daily Motion.		Logarithm of Radius Vector.		Logarithm of Ear	
	"	"	"	"	"	"	"	"	"	"	"	"	"	"	At Date.	
Apr. 1	278	4	52.0	2	51	57.8	+12	36.2	-5	26	3.7	-13	14.6	9.660 8091	0.033	5594
2	280	57	45.2	2	53	50.9	12	16.7	5	38	57.4	12	32.3	9.658 5993	0.038	8253
3	283	52	38.5	2	55	38.0	11	49.3	5	51	7.5	11	47.4	9.656 1237	0.043	9661
4	286	49	46.1	2	58	19.6	11	14.2	6	2	31.3	10	59.6	9.653 3814	0.048	9826
5	289	49	22.7	3	0	56.1	10	31.3	6	13	5.7	10	8.6	9.650 3714	0.053	8756
6	292	51	43.4	3	3	48.1	+9	40.8	-6	22	47.4	-9	14.1	9.647 0931	0.058	6452
7	295	57	4.1	3	6	56.2	8	42.8	6	31	32.6	8	15.7	9.643 5462	0.063	2911
8	299	5	41.3	3	10	21.0	7	37.6	6	39	17.3	7	13.0	9.639 7306	0.067	8125
9	302	17	51.9	3	14	3.1	6	25.6	6	45	57.1	6	5.7	9.635 6466	0.072	2079
10	305	33	53.5	3	18	3.2	5	7.2	6	51	27.1	4	53.3	9.631 2953	0.076	4753
11	308	54	4.6	3	22	22.2	+3	43.1	-6	55	41.9	-3	35.3	9.626 6788	0.080	6121
12	312	18	44.4	3	27	0.7	2	14.0	6	58	35.8	2	11.4	9.621 8001	0.084	6148
13	315	48	12.7	3	31	59.3	+0	40.9	7	0	2.6	-0	41.0	9.616 6634	0.088	4790
14	319	22	50.0	3	37	18.8	-0	55.1	6	59	55.4	+0	56.5	9.611 2745	0.092	1996
15	323	2	57.4	3	42	59.8	2	32.7	6	58	7.0	2	41.5	9.605 6413	0.095	7703
16	326	48	56.8	3	49	2.7	-4	10.3	-6	54	29.8	+4	34.3	9.599 7740	0.099	1837
17	330	41	10.2	3	55	27.9	5	46.1	6	48	55.7	6	35.4	9.593 6854	0.102	4318
18	334	40	0.1	4	2	15.7	7	18.1	6	41	16.3	8	45.0	9.587 3914	0.105	5048
19	338	45	49.1	4	9	26.0	8	44.0	6	31	22.9	11	3.2	9.580 9119	0.108	3917
20	342	58	59.5	4	16	58.4	10	1.4	6	19	7.0	13	30.0	9.574 2712	0.111	0803
21	347	19	53.0	4	24	52.1	-11	7.6	-6	4	20.0	+16	5.3	9.567 4982	0.113	5569
22	351	48	50.3	4	33	5.7	11	59.9	5	46	53.9	18	48.2	9.560 6275	0.115	8062
23	356	26	10.4	4	41	37.3	12	35.5	5	26	41.5	21	37.6	9.553 6999	0.117	8115
24	1	12	10.0	4	50	24.2	12	51.6	5	3	37.1	24	31.9	9.546 7630	0.119	5548
25	6	7	2.9	4	59	23.0	12	45.9	4	37	36.7	27	29.2	9.539 8714	0.121	0167
26	11	10	58.7	5	8	39.2	-12	16.5	-4	8	38.7	+30	26.5	9.533 0868	0.122	1763
27	16	24	2.0	5	17	37.2	11	22.2	3	36	44.9	33	20.2	9.526 4784	0.123	0119
28	21	46	11.5	5	26	40.3	10	2.6	3	2	1.0	36	6.1	9.520 1221	0.123	5007
29	27	17	18.4	5	35	30.7	8	18.7	2	24	37.2	38	39.1	9.514 0994	0.123	6197
30	32	57	5.7	5	43	59.5	6	12.7	1	44	49.0	40	53.7	9.508 4961	0.123	3462
May 1	38	45	7.0	5	51	57.1	-3	48.6	-1	2	57.8	+42	44.1	9.503 4000	0.122	6583
2	44	40	46.0	5	59	12.9	-1	11.6	-0	19	30.7	44	4.6	9.498 8982	0.121	5347
3	50	43	15.5	6	5	36.3	+1	31.6	+0	24	59.7	44	49.7	9.495 0735	0.119	9569
4	56	51	37.8	6	10	56.9	4	13.2	1	9	55.6	44	55.1	9.492 0013	0.117	9092
5	63	4	45.2	6	15	5.1	6	44.8	1	54	35.7	44	17.7	9.489 7453	0.115	3790
6	69	21	21.1	6	17	52.6	+8	58.5	+2	38	16.4	+42	56.3	9.488 3542	0.112	3579
7	75	40	1.5	6	19	13.4	10	46.7	3	20	13.9	40	51.8	9.487 8588	0.108	8423
8	81	59	17.7	6	19	3.8	12	3.5	3	59	46.4	38	7.0	9.488 2703	0.104	8333
9	88	17	38.7	6	17	23.2	12	45.1	4	36	16.0	34	46.8	9.489 5794	0.100	3369
10	94	33	34.5	6	14	14.0	12	49.7	5	9	10.4	30	57.7	9.491 7572	0.095	3640
11	100	45	38.7	6	9	41.1	+12	18.3	+5	38	4.5	+26	47.5	9.494 7563	0.089	9293
12	106	52	31.4	6	3	52.4	11	13.6	6	2	41.1	22	24.2	9.498 5142	0.084	0509
13	112	53	1.6	5	56	57.7	9	40.5	6	22	51.0	17	55.4	9.502 9566	0.077	7507
14	118	46	8.5	5	49	7.8	7	44.7	6	38	32.3	13	28.1	9.508 0012	0.071	0526
15	124	31	2.5	5	40	34.1	5	32.8	6	49	49.8	9	8.7	9.513 5613	0.063	9815
16	130	7	5.8	5	31	28.2	+3	11.6	+6	56	54.0	+5	2.2	9.519 5488	0.056	5636
17	135	33	51.8	5	22	1.2	+0	47.3	+6	59	59.6	+1	12.0	9.525 8777	0.048	8253

MERCURY.

GREENWICH MEAN NOON.

Date.	Heliocentric Longitude, Mean Equinox of Date.	Daily Motion.	Reduction to Orbit.	Heliocentric Latitude.	Daily Motion.	Logarithm of Radius Vec- tor.	Logarithm of Distance from Earth—	
							At Date.	At Interme- diate Date.
May 16	130 7 5.8	5 31 28.2	+ 3 11.6	+6 56 54.0	+ 5 2.2	9.519 5488	0.056 5636	0.052 7329
17	135 33 51.8	5 22 1.2	+ 0 47.3	6 59 59.6	+ 1 12.0	9.525 8777	0.048 8253	0.044 8440
18	140 51 4.4	5 12 23.0	- 1 34.4	6 59 24.2	- 2 19.4	9.532 4660	0.040 7923	0.036 6733
19	145 58 37.0	5 2 42.5	3 48.8	6 55 27.5	5 30.6	9.539 2373	0.032 4901	0.028 2458
20	150 56 31.0	4 53 7.1	5 52.2	6 48 29.8	8 21.3	9.546 1218	0.023 9433	0.019 5855
21	155 44 54.9	4 43 43.0	- 7 41.7	+6 38 51.5	-10 51.8	9.553 0570	0.015 1753	0.010 7154
22	160 24 2.4	4 34 35.1	9 15.5	6 26 52.5	13 3.0	9.559 9875	0.006 2086	0.001 6574
23	164 54 11.6	4 25 47.0	10 32.4	6 12 51.4	14 56.1	9.566 8653	9.997 0644	9.992 4321
24	169 15 43.8	4 17 21.4	11 32.2	5 57 5.7	16 32.5	9.573 6490	9.987 7630	9.983 0595
25	173 29 2.5	4 9 20.2	12 14.9	5 39 51.4	17 53.6	9.580 3033	9.978 3239	9.973 5586
26	177 34 32.5	4 1 44.3	-12 41.2	+5 21 23.0	-19 1.1	9.586 7988	9.968 7658	9.963 9477
27	181 32 39.6	3 54 34.2	12 51.9	5 1 53.3	19 56.4	9.593 1109	9.959 1066	9.954 2447
28	185 23 49.5	3 47 49.9	12 48.2	4 41 33.8	20 40.9	9.599 2193	9.949 3642	9.944 4672
29	189 8 28.0	3 41 31.4	12 31.2	4 20 34.7	21 16.0	9.605 1077	9.939 5560	9.934 6329
30	192 47 0.7	3 35 38.0	12 2.4	3 59 4.7	21 42.8	9.610 7630	9.929 7001	9.924 7597
31	196 19 52.1	3 30 8.8	-11 23.1	+3 37 11.5	-22 2.4	9.616 1748	9.919 8140	9.914 8654
June 1	199 47 26.2	3 25 3.2	10 34.6	3 15 2.0	-22 15.8	9.621 3351	9.909 9162	9.904 9689
2	203 10 6.1	3 20 20.2	9 38.3	2 52 41.8	-22 33.8	9.626 2380	9.900 0260	9.895 0500
3	206 28 13.8	3 15 58.8	8 35.4	2 30 15.9	-22 27.2	9.630 8789	9.890 1637	9.885 2497
4	209 42 10.6	3 11 58.1	7 27.1	2 7 48.7	-22 26.6	9.635 2548	9.880 3509	9.875 4702
5	212 52 16.6	3 8 17.2	- 6 14.6	+1 45 23.9	-22 22.6	9.639 3637	9.870 6108	9.865 7758
6	215 58 51.3	3 4 55.2	4 59.0	1 23 4.6	-22 15.5	9.643 2043	9.860 9684	9.856 1922
7	219 2 13.1	3 1 51.3	3 41.2	1 0 53.7	-22 5.9	9.646 7762	9.851 4509	9.846 7482
8	222 2 39.6	2 59 4.6	2 22.2	0 38 53.5	-21 54.1	9.650 0794	9.842 0879	9.837 4741
9	225 0 27.7	2 56 34.4	- 1 2.7	+0 17 6.2	-21 40.3	9.653 1140	9.832 9112	9.828 4035
10	227 55 53.6	2 54 20.0	+ 0 16.3	-0 4 26.5	-21 24.8	9.655 8809	9.823 9554	9.819 5718
11	230 49 12.7	2 52 20.8	1 34.2	0 25 42.9	-21 7.8	9.658 3811	9.815 2578	9.811 0183
12	233 40 40.0	2 50 36.3	2 50.4	0 46 41.7	-20 49.4	9.660 6155	9.806 8587	9.802 7843
13	236 30 29.9	2 49 5.9	4 4.1	1 7 21.5	-20 29.8	9.662 5850	9.793 8008	9.794 9139
14	239 18 56.3	2 47 40.2	5 14.9	1 27 41.1	-20 9.1	9.664 2906	9.791 1295	9.787 4537
15	242 6 12.7	2 46 45.8	+ 6 22.1	-1 47 39.4	-19 47.3	9.665 7332	9.783 8926	9.780 4525
16	244 52 32.2	2 45 55.4	7 25.4	2 7 15.3	-19 24.4	9.666 9138	9.777 1397	9.773 9607
17	247 38 7.7	2 45 17.8	8 24.2	2 26 27.9	-19 0.5	9.667 8330	9.770 9218	9.768 0294
18	250 23 11.9	2 44 52.7	9 18.1	2 45 16.0	-18 35.5	9.668 4914	9.765 2890	9.762 7096
19	253 7 57.2	2 44 39.9	10 6.7	3 3 38.6	-18 9.4	9.668 8895	9.760 2948	9.758 0515
20	255 52 35.8	2 44 39.4	+10 49.7	-3 21 34.6	-17 42.3	9.669 0275	9.755 9859	9.754 1037
21	258 37 20.0	2 44 51.1	11 26.7	3 39 2.9	-17 14.1	9.668 9057	9.752 4103	9.750 9110
22	261 22 22.0	2 45 15.0	11 57.5	3 56 2.3	-16 44.5	9.668 5238	9.749 6106	9.748 5136
23	264 7 54.1	2 45 51.2	12 21.7	4 12 31.4	-16 13.5	9.667 8815	9.747 6243	9.746 9464
24	266 54 8.5	2 46 39.7	12 39.0	4 28 28.8	-15 41.1	9.666 9785	9.746 4831	9.746 2373
25	269 41 17.6	2 47 40.7	+12 49.3	-4 43 53.0	-15 7.0	9.665 8142	9.746 2111	9.746 4062
26	272 29 34.1	2 48 54.5	12 52.3	4 58 42.3	-14 31.2	9.664 3878	9.746 8238	9.747 4644
27	275 19 10.8	2 50 21.1	12 47.8	5 12 54.7	-13 53.4	9.662 6986	9.748 3279	9.749 4138
28	278 10 20.7	2 52 1.0	12 35.7	5 26 28.2	-13 13.4	9.660 7455	9.750 7208	9.752 2471
29	281 3 17.3	2 53 54.6	12 15.9	5 39 20.6	-12 31.0	9.658 5275	9.753 9905	9.755 9482
30	283 58 14.5	2 56 2.1	+11 48.4	-5 51 29.3	-11 46.0	9.656 0438	9.758 1167	9.760 4921
July 1	286 55 26.4	2 58 24.1	+11 13.0	-6 2 51.6	-10 58.1	9.653 2935	9.763 0703	9.765 8464

MERCURY.

GREENWICH MEAN NOON.

Date.	Heliocentric Longitude, Mean Equinox of Date.	Daily Motion.	Reduction to Orbit.	Heliocentric Latitude.	Daily Motion.	Logarithm of Radius Vec- tor.	Logarithm of Dist. Earth—	
							At Date.	At dia
July	1 286 55 26.4	2 58 24.1	+11 13.0	-6 2 51.6	-10 58.1	9.653 2935	9.763 0703	9.7
	2 289 55 7.7	3 1 1.1	10 29.9	6 13 24.4	10 7.0	9.650 2756	9.768 8154	9.7
	3 292 57 33.8	3 3 53.6	9 39.1	6 23 4.4	9 12.4	9.646 9892	9.775 3104	9.7
	4 296 3 0.3	3 7 2.1	8 40.9	6 31 47.9	8 13.9	9.643 4341	9.782 5081	9.7
	5 299 11 43.6	3 10 27.4	7 35.5	6 39 30.7	7 11.0	9.639 6102	9.790 3577	9.7
	6 302 24 0.9	3 14 30.1	+6 23.3	-6 46 8.4	-6 3.5	9.635 5179	9.798 8061	9.8
	7 305 40 9.9	3 18 10.9	5 4.7	6 51 36.1	4 50.9	9.631 1585	9.807 7987	9.8
	8 309 0 29.0	3 22 30.4	3 40.4	6 55 48.5	3 32.8	9.626 5339	9.817 2806	9.8
	9 312 25 17.3	3 27 9.4	2 11.2	6 58 39.8	2 8.7	9.621 6473	9.827 1971	9.8
	10 315 54 54.6	3 32 8.7	+0 38.0	7 0 3.8	-0 38.0	9.616 5028	9.837 4948	9.8
	11 319 29 41.6	3 37 28.9	-0 58.1	-6 59 53.6	+0 59.7	9.611 1063	9.848 1212	9.8
	12 323 9 59.5	3 43 10.5	2 35.7	6 58 2.0	2 44.8	9.605 4658	9.859 0261	9.8
	13 326 56 9.9	3 49 14.0	4 13.2	6 54 21.3	4 37.8	9.599 5915	9.870 1612	9.8
	14 330 48 35.0	3 55 40.0	5 49.0	6 48 43.5	6 39.2	9.593 4963	9.881 4801	9.8
	15 334 47 37.4	4 2 28.6	7 20.8	6 41 0.1	8 49.1	9.587 1963	9.892 9385	9.8
	16 338 53 39.6	4 9 39.5	-8 46.5	-6 31 2.5	+11 7.6	9.580 7115	9.904 4940	9.9
	17 343 7 3.8	4 17 12.5	10 3.6	6 18 42.0	13 34.7	9.574 0661	9.916 1057	9.9
	18 347 28 11.7	4 25 6.8	11 9.5	6 3 50.2	16 10.2	9.567 2895	9.927 7341	9.9
	19 351 57 24.1	4 33 21.0	12 1.3	5 46 19.1	18 53.2	9.560 4164	9.939 3411	9.9
	20 356 34 59.8	4 41 53.2	12 36.3	5 26 1.6	21 42.8	9.553 4877	9.950 8892	9.9
Aug.	21 1 21 15.5	4 50 40.7	-12 51.8	-5 2 51.9	+24 37.4	9.546 5512	9.962 3414	9.9
	22 6 16 24.8	4 59 39.8	12 45.4	4 36 46.0	27 34.7	9.539 6618	9.973 6613	9.9
	23 11 20 37.3	5 8 46.0	12 15.2	4 7 42.6	30 31.9	9.532 8815	9.984 8124	9.9
	24 16 33 57.4	5 17 53.8	11 20.1	3 35 43.5	33 25.4	9.526 2797	9.995 7586	0.0
	25 21 56 23.4	5 26 56.7	9 59.7	3 0 54.4	36 10.9	9.519 9323	0.006 4639	0.0
	26 27 27 46.5	5 35 46.6	-8 15.1	-2 23 25.9	+38 43.4	9.513 9211	0.016 8920	0.0
	27 33 7 49.4	5 44 14.7	6 8.5	1 43 33.7	40 57.4	9.508 3319	0.027 0074	0.0
	28 38 56 5.4	5 52 11.2	3 43.9	1 1 39.1	42 47.0	9.503 2526	0.036 7753	0.0
	29 44 51 57.7	5 59 25.6	-1 6.6	-0 18 9.5	44 6.5	9.498 7702	0.046 1623	0.0
	30 50 54 38.9	6 3 47.2	+1 36.6	+0 26 22.2	44 50.5	9.494 9675	0.055 1367	0.0
	31 57 3 11.0	6 11 5.7	+4 18.0	+1 11 18.3	+44 54.6	9.491 9193	0.063 6693	0.0
	1 63 16 26.0	6 15 11.5	6 49.2	1 55 57.3	44 15.9	9.489 6888	0.071 7348	0.0
	2 69 33 7.1	6 17 56.5	9 2.2	2 39 35.5	42 53.1	9.488 3245	0.079 3115	0.0
	3 75 51 50.1	6 19 14.6	10 49.5	3 21 29.2	40 47.2	9.487 8568	0.086 3826	0.0
	4 82 11 6.1	6 19 2.2	12 5.3	4 0 56.6	38 1.2	9.488 2960	0.092 9362	0.0
	5 88 29 24.1	6 17 18.8	+12 45.8	+4 37 19.9	+34 40.1	9.489 6322	0.098 9659	0.1
	6 94 45 14.2	6 14 6.8	12 49.3	5 10 7.3	30 50.4	9.491 8358	0.104 4707	0.1
	7 100 57 10.1	6 9 31.6	12 16.8	5 38 53.8	26 39.7	9.494 8592	0.109 4550	0.1
	8 107 3 52.3	6 3 40.8	11 11.2	6 3 22.4	22 16.0	9.498 6393	0.113 9277	0.1
	9 113 4 9.8	5 56 44.2	9 37.2	6 23 24.0	17 47.1	9.503 1016	0.117 9021	0.1
Aug.	10 118 57 2.3	5 48 52.7	+7 40.8	+6 38 57.1	+13 20.0	9.508 1634	0.121 3946	0.1
	11 124 41 40.8	5 40 17.9	5 28.6	6 50 6.6	9 0.9	9.513 7378	0.124 4250	0.1
	12 130 17 27.5	5 31 11.2	3 7.2	6 57 3.2	4 54.8	9.519 7370	0.127 0146	0.1
	13 135 43 56.2	5 21 43.7	+0 42.9	7 0 1.7	+1 5.2	9.526 0750	0.129 1859	0.1
	14 141 0 51.2	5 12 5.3	-1 38.7	6 59 19.9	-2 25.6	9.532 6700	0.130 9621	0.1
	15 146 8 6.0	5 2 24.8	-3 52.8	+6 55 17.3	-5 36.2	9.539 4460	0.132 3665	0.1
	16 151 5 42.4	4 52 49.6	-5 55.8	+6 48 14.3	-8 26.3	9.546 3330	0.133 4221	0.1

MERCURY.

GREENWICH MEAN NOON.

date.	Heliocentric Longitude, Mean Equinox of Date.			Daily Motion.			Reduction to Orbit.			Heliocentric Latitude.			Daily Motion.			Logarithm of Radius Vector.			Logarithm of Distance from Earth—	
	°	'	"	°	'	"	°	'	"	°	'	"	°	'	"			At Date.	At Intermediate Date.	
Aug. 16	151	5	42.4	4	52	49.6	-	5	55.8	+6	48	14.3	-	8	26.3	9.546 3330	0.133 4221	0.133 8259		
17	155	53	49.1	4	43	26.0		7	44.8	6	38	31.4	10	56.2	9.553 2689	0.134 1506	0.134 3987			
18	160	32	39.9	4	34	18.7		9	18.1	6	26	28.3	13	6.9	9.560 1986	0.134 5728	0.134 6754			
19	165	2	33.0	4	25	31.2		10	34.5	6	12	23.7	14	59.4	9.567 0742	0.134 7087	0.134 6751			
20	169	23	49.7	4	17	6.3		11	33.8	5	56	35.1	16	35.2	9.573 8545	0.134 5766	0.134 4152			
21	173	36	53.7	4	9	5.8	-12	16.0	+5	39	18.3	-17	55.9	9.580 5045	0.134 1929	0.133 9118				
22	177	42	9.8	4	1	30.6		12	41.8	5	20	47.8	19	3.0	9.586 9949	0.133 5736	0.133 1799			
23	181	40	3.6	3	54	21.4		12	52.0	5	1	16.4	19	58.0	9.593 3010	0.132 7323	0.132 2325			
24	185	31	1.2	3	47	38.0		12	47.9	4	40	55.5	20	42.1	9.599 4029	0.131 6817	0.131 0814			
25	189	15	28.2	3	41	20.2		12	30.5	4	19	55.3	21	16.8	9.605 2844	0.130 4329	0.129 7374			
26	192	53	50.0	3	35	27.5	-12	1.3	+3	58	24.5	-21	43.4	9.610 9324	0.128 9960	0.128 2097				
27	196	26	31.3	3	29	59.2		11	21.7	3	36	30.7	22	2.9	9.616 3366	0.127 3795	0.126 5064			
28	199	53	56.1	3	24	54.3		10	32.9	3	14	20.8	22	16.1	9.621 4893	0.125 5911	0.124 6345			
29	203	16	27.3	3	20	11.9		9	36.4	2	52	0.3	22	24.0	9.626 3843	0.123 6373	0.122 6002			
30	206	34	27.0	3	15	51.1		8	33.3	2	29	34.3	22	27.3	9.631 0172	0.121 5236	0.120 4083			
Sept. 1	209	48	16.4	3	11	51.0	-	7	24.9	+2	7	7.1	-22	26.5	9.635 3850	0.119 2546	0.118 0631			
2	212	58	15.6	3	8	10.7		6	12.3	1	44	42.4	22	22.3	9.639 4856	0.116 8340	0.115 5678			
3	216	4	44.1	3	4	49.3		4	56.6	1	22	23.4	22	15.2	9.643 3179	0.114 2647	0.112 9250			
4	219	8	0.2	3	1	45.9		3	38.8	1	0	12.8	22	5.6	9.646 8815	0.111 5489	0.110 1366			
5	222	8	21.6	2	58	59.7		2	19.7	0	38	13.0	21	53.7	9.650 1764	0.108 6882	0.107 2039			
6	225	6	5.1	2	56	30.0	-	1	0.3	+0	16	26.0	-21	39.9	9.653 2028	0.105 6836	0.104 1273			
7	228	1	26.8	2	54	16.1	+0	0	18.7	-0	5	6.2	21	24.3	9.655 9617	0.102 5350	0.100 9067			
8	230	54	42.3	2	52	17.4		1	36.6	0	26	22.1	21	7.2	9.658 4538	0.099 2422	0.097 5414			
9	233	46	6.4	2	50	33.3		2	52.7	0	47	20.3	20	48.8	9.660 6799	0.095 8042	0.094 0304			
10	236	35	53.5	2	49	3.3		4	6.4	1	7	59.4	20	29.2	9.662 6413	0.092 2197	0.090 3719			
11	239	24	17.5	2	47	47.0	+5	5	17.0	-1	28	18.3	-20	8.5	9.664 3388	0.088 4867	0.086 5638			
12	242	11	31.9	2	46	44.0		6	24.1	1	48	16.0	19	46.7	9.665 7733	0.084 6029	0.082 6036			
13	244	57	49.9	2	45	54.1		7	27.2	2	7	51.3	19	23.7	9.666 9458	0.080 5656	0.078 4884			
14	247	43	24.3	2	45	16.8		8	25.9	2	27	3.1	18	59.7	9.667 8570	0.076 3715	0.074 2146			
15	250	28	27.7	2	44	52.0		9	19.6	2	45	50.4	18	34.7	9.668 5075	0.072 0171	0.069 7786			
16	253	13	12.5	2	44	39.7	+10	8.1	-3	4	12.2	-18	8.7	9.668 8975	0.067 4985	0.065 1763				
17	255	57	51.1	2	44	39.6		10	50.9	3	22	7.4	17	41.6	9.669 0275	0.062 8115	0.060 4034			
18	258	42	35.7	2	44	51.6		11	27.8	3	39	34.9	17	13.2	9.668 8976	0.057 9515	0.055 4551			
19	261	27	38.4	2	45	15.9		11	58.3	3	56	33.4	16	43.5	9.668 5075	0.052 9136	0.050 3264			
20	264	13	11.6	2	45	52.5		12	22.3	4	13	1.5	16	12.5	9.667 8571	0.047 6928	0.045 0121			
21	266	59	27.5	2	46	41.4	+12	39.4	-4	28	57.9	-15	40.0	9.666 9461	0.042 2837	0.039 5068				
22	269	46	38.5	2	47	42.8		12	49.5	4	44	21.0	15	5.9	9.665 7736	0.036 6808	0.033 8049			
23	272	34	57.3	2	48	57.0		12	52.2	4	59	9.1	14	30.0	9.664 3389	0.030 8784	0.027 9006			
24	275	24	36.7	2	50	24.0		12	47.5	5	13	20.4	13	52.2	9.662 6415	0.024 8708	0.021 7883			
25	278	15	49.7	2	52	4.3		12	35.2	5	26	52.7	13	12.1	9.660 6803	0.018 6524	0.015 4625			
26	281	8	49.8	2	53	58.3	+12	15.2	-5	39	43.8	-12	29.6	9.658 4542	0.012 2178	0.008 9177				
27	284	3	50.9	2	56	6.3		11	47.3	5	51	51.1	11	44.5	9.655 9622	0.005 5617	0.002 1491			
28	287	1	7.3	2	58	28.8		11	11.8	6	3	11.9	10	56.6	9.653 2034	0.998 6794	0.995 1522			
29	290	0	53.5	3	1	6.2		10	28.4	6	13	43.2	10	5.4	9.650 1770	0.991 5671	0.987 9236			
30	293	3	24.9	3	3	59.2		9	37.4	6	23	21.5	9	10.6	9.646 8822	0.984 2217	0.980 4613			
Oct. 1	296	8	57.3	3	7	8.2	+8	39.0	-6	32	3.1	-8	11.9	9.643 3186	0.976 6423	0.972 7647				
2	299	17	47.0	3	10	34.0	+7	33.4	-6	39	44.0	-7	9.0	9.639 4862	0.968 8289	0.964 8354				

MERCURY.

GREENWICH MEAN NOON.

Date.	Heliocentric Longitude, Mean Equinox of Date.	Daily Motion.	Reduction to Orbit.	Heliocentric Latitude.	Daily Motion.	Logarithm of Radius Vector.	Logarithm of Distance from Earth—	
							At Date.	At Intermediate Date.
Oct.	1 299 17 47.0	3 10 34.0	+ 7 33.4	-6 39 44.0	- 7 9.0	9.639 4862	9.968 8289	9.964 83
	2 302 30 11.2	3 14 17.2	6 20.9	6 46 19.6	6 1.4	9.635 3857	9.960 7848	9.956 67
	3 305 46 27.7	3 18 18.6	5 2.2	6 51 45.1	4 48.6	9.631 0180	9.952 5156	9.948 29
	4 309 6 54.9	3 22 38.8	3 37.7	6 55 55.1	3 30.3	9.626 3851	9.944 0318	9.939 71
	5 312 31 51.9	3 27 18.5	2 8.4	6 58 43.8	2 6.0	9.621 4902	9.935 3485	9.930 93
	6 316 1 38.6	3 32 18.4	+ 0 35.0	-7 0 4.9	- 0 35.1	9.616 3377	9.926 4869	9.921 99
	7 319 36 35.6	3 37 39.2	- 1 1.1	6 59 51.7	+ 1 2.8	9.610 9334	9.917 4756	9.912 92
	8 323 17 4.2	3 43 21.5	2 38.7	6 57 56.9	2 48.2	9.605 2853	9.908 3530	9.903 76
	9 327 3 26.0	3 49 25.8	4 16.2	6 54 12.7	4 41.5	9.599 4038	9.899 1686	9.894 57
	10 330 56 3.2	3 55 52.4	5 51.9	6 48 31.1	6 43.1	9.593 3019	9.889 9848	9.885 41
	11 334 55 18.4	4 2 41.7	- 7 23.6	-6 40 43.7	+ 8 53.3	9.586 9958	9.880 8799	9.876 38
	12 339 1 34.1	4 9 53.4	8 49.1	6 30 41.8	11 12.1	9.580 5054	9.871 9489	9.867 58
	13 343 15 12.5	4 17 27.1	10 5.9	6 18 16.7	13 39.5	9.573 8553	9.863 3065	9.859 13
	14 347 36 35.4	4 25 22.0	11 11.3	6 3 20.1	16 15.1	9.567 0750	9.855 0875	9.851 18
	15 352 6 3.2	4 33 36.8	12 2.6	5 45 43.9	18 58.4	9.560 1994	9.847 4470	9.843 897
	16 356 43 55.0	4 42 9.5	-12 37.1	-5 25 21.1	+21 48.2	9.553 2696	9.840 5584	9.837 454
	17 1 30 27.3	4 50 57.4	12 51.9	5 2 5.9	24 42.9	9.546 3337	9.834 6094	9.832 048
	18 6 25 53.6	4 59 56.8	12 44.8	4 35 54.5	27 40.2	9.539 4467	9.829 7951	9.827 874
	19 11 30 23.2	5 9 3.3	12 13.9	4 6 45.6	30 37.3	9.532 6708	9.826 3085	9.825 110
	20 16 44 0.6	5 18 11.1	11 18.0	3 34 41.1	33 30.7	9.526 0757	9.824 3275	9.823 940
	21 22 6 43.7	5 27 13.6	- 9 56.9	-2 59 46.9	+36 15.9	9.519 7376	9.824 0013	9.824 493
	22 27 38 23.5	5 36 3.0	8 11.5	2 22 13.6	38 47.9	9.513 7382	9.825 4357	9.826 831
	23 33 18 42.3	5 44 30.3	6 4.3	1 42 17.2	41 1.3	9.508 1636	9.828 6820	9.830 983
	24 39 7 13.3	5 52 25.6	3 39.2	1 0 19.2	42 50.1	9.503 1017	9.833 7284	9.836 905
	25 45 3 19.3	5 59 38.4	- 1 1.6	-0 16 47.1	44 8.5	9.498 6393	9.840 4986	9.844 490
	26 51 6 12.5	6 5 58.2	+ 1 41.7	+0 27 46.0	+44 51.3	9.494 8591	9.848 8575	9.853 576
	27 57 14 54.7	6 11 14.6	4 22.9	1 12 42.2	44 54.1	9.491 8357	9.858 6202	9.863 960
	28 63 28 17.5	6 15 18.0	6 53.7	1 57 19.9	44 14.0	9.489 6319	9.869 5670	9.875 410
	29 69 45 3.7	6 18 0.2	9 6.0	2 40 55.6	47 49.8	9.488 2955	9.881 4594	9.887 684
	30 76 3 49.1	6 19 15.3	10 52.4	3 22 45.3	49 42.6	9.487 8562	9.894 0549	9.900 542
	31 82 23 4.6	6 19 0.1	+12 7.1	+4 2 7.5	+37 55.4	9.488 3240	9.907 1196	9.913 759
Nov.	1 88 41 19.4	6 17 14.0	12 46.4	4 38 24.6	34 33.3	9.489 6881	9.920 4387	9.927 133
	2 94 57 3.4	6 13 59.3	12 48.8	5 11 4.8	30 42.9	9.491 9182	9.933 8228	9.940 4876
	3 101 8 50.7	6 9 21.6	12 15.2	5 39 43.5	26 31.7	9.494 9663	9.947 1104	9.953 6756
	4 107 15 21.9	6 3 28.7	11 8.6	6 4 3.9	22 7.6	9.498 7690	9.960 1693	9.966 5793
	5 113 15 26.4	5 56 30.2	+ 9 33.9	+6 23 57.1	+17 38.6	9.503 2514	9.972 8951	9.979 1076
	6 119 8 4.1	5 48 37.1	7 36.9	6 39 21.8	13 11.8	9.508 3307	9.985 2092	9.991 1934
	7 124 52 26.3	5 40 1.1	5 24.3	6 50 23.3	8 53.1	9.513 9198	9.997 0549	0.002 7895
	8 130 27 55.8	5 30 53.6	3 2.7	6 57 12.3	4 47.4	9.519 9310	0.008 3942	0.013 8667
	9 135 54 6.7	5 21 25.6	+ 0 38.4	7 0 3.6	+ 0 58.3	9.526 2784	0.019 2056	0.024 4100
	10 141 10 43.4	5 11 47.0	- 1 43.0	+6 59 15.2	- 2 31.8	9.532 8803	0.029 4796	0.034 4147
	11 146 17 40.0	5 2 6.6	3 56.8	6 55 6.7	5 41.7	9.539 6606	0.039 2161	0.043 8849
	12 151 14 58.5	4 52 31.8	5 59.4	6 47 58.5	8 31.2	9.546 5500	0.048 4227	0.052 8313
	13 156 2 47.5	4 43 8.6	7 48.0	6 38 11.0	11 0.6	9.553 4864	0.057 1125	0.061 2686
	14 160 41 21.1	4 34 1.7	9 20.7	6 26 3.8	13 10.6	9.560 4151	0.065 3019	0.069 2149
	15 165 10 57.6	4 25 14.9	-10 36.6	+6 11 55.8	-15 2.5	9.567 2884	0.073 0100	0.076 6898
	16 169 31 58.5	4 16 50.9	-11 35.3	+5 56 4.2	-16 37.9	9.574 0652	0.080 2570	0.083 7142

MERCURY.

GREENWICH MEAN NOON.

Date.	Heliocentric Longitude, Mean Equinox of Date.	Daily Motion.	Reduction to Orbit.	Heliocentric Latitude.	Daily Motion.	Logarithm of Radius Vector.	Logarithm of Distance from Earth—	
							At Date.	At Intermediate Date.
Nov. 16	169 31 58.5	4 16 50.9	-11 35.3	+5 56 4.2	-16 37.9	9.574 0652	0.080 2570	0.083 7142
17	173 44 47.5	4 8 51.2	12 17.0	5 38 44.9	17 58.2	9.580 7106	0.087 0640	0.090 3091
18	177 49 49.4	4 1 16.8	12 42.3	5 20 12.3	19 4.9	9.587 1954	0.093 4522	0.096 4958
19	181 47 29.8	3 54 8.3	12 52.1	5 0 39.2	19 59.4	9.593 4954	0.099 4423	0.102 2943
20	185 38 14.7	3 47 25.7	12 47.5	4 40 17.0	20 43.3	9.599 5906	0.105 0543	0.107 7246
21	189 22 29.9	3 41 8.8	-12 29.8	+4 19 15.7	-21 17.9	9.605 4650	0.110 3075	0.112 8052
22	193 0 40.7	3 35 16.9	12 0.3	3 57 44.0	21 44.2	9.611 1056	0.115 2200	0.117 5540
23	196 33 11.8	3 29 49.2	11 20.3	3 35 49.7	22 3.3	9.616 5021	0.119 8093	0.121 9878
24	200 0 27.0	3 24 45.0	10 31.3	3 13 39.4	22 16.4	9.621 6466	0.124 0912	0.126 1216
25	203 22 49.4	3 20 3.3	9 34.6	2 51 18.7	22 24.2	9.626 5333	0.128 0807	0.129 9703
26	206 40 40.9	3 15 43.2	-8 31.3	+2 28 52.6	-22 27.3	9.631 1580	0.131 7920	0.133 5472
27	209 54 22.8	3 11 43.8	7 22.7	2 6 25.5	22 26.4	9.635 5175	0.135 2374	0.136 8641
28	213 4 15.2	3 8 4.2	6 10.0	1 44 0.9	22 22.2	9.639 6097	0.138 4288	0.139 9328
29	216 10 37.4	3 4 43.3	4 54.2	1 21 42.1	22 15.0	9.643 4336	0.141 3773	0.142 7636
30	219 13 47.8	3 1 40.4	3 36.4	0 59 31.8	22 5.2	9.646 9887	0.144 0928	0.145 3659
Dec. 1	222 14 4.0	2 58 54.7	-2 17.3	+0 37 32.4	-21 53.3	9.650 2751	0.146 5839	0.147 7480
2	225 11 42.8	2 56 25.5	-0 57.8	+0 15 45.9	-21 39.5	9.653 2932	0.148 8591	0.149 9181
3	228 7 0.3	2 54 12.1	+0 21.2	-0 5 45.9	-21 23.9	9.656 0437	0.150 9257	0.151 8828
4	231 0 12.1	2 52 13.9	1 39.0	0 27 1.3	-21 6.7	9.658 5275	0.152 7900	0.153 6482
5	233 51 33.0	2 50 30.3	2 55.0	0 47 58.9	-20 48.2	9.660 7454	0.154 4580	0.155 2202
6	236 41 17.3	2 49 0.7	+4 8.6	-1 8 37.4	-20 28.6	9.662 6984	0.155 9352	0.156 6037
7	239 29 38.9	2 47 44.8	5 19.1	1 28 55.7	-20 7.8	9.664 3876	0.157 2261	0.157 8030
8	242 16 51.4	2 46 42.2	6 26.1	1 48 52.7	-19 45.9	9.665 8141	0.158 3347	0.158 8217
9	245 3 7.8	2 45 59.7	7 29.1	2 8 27.2	-19 23.0	9.666 9785	0.159 2644	0.159 6631
10	247 48 41.0	2 45 15.9	8 27.6	2 27 38.3	-18 59.0	9.667 8815	0.160 0180	0.160 3295
11	250 33 43.7	2 44 51.5	+9 21.2	-2 46 24.9	-18 33.9	9.668 5237	0.160 5979	0.160 8234
12	253 18 28.2	2 44 39.5	10 9.5	3 4 45.9	-18 7.8	9.668 9057	0.161 0061	0.161 1462
13	256 3 6.8	2 44 39.7	10 52.2	3 22 40.2	-17 40.6	9.669 0275	0.161 2437	0.161 2988
14	258 47 51.8	2 44 52.2	11 28.8	3 40 6.8	-17 12.3	9.668 8894	0.161 3114	0.161 2816
15	261 32 55.3	2 45 16.9	11 59.2	3 57 4.3	-16 42.7	9.668 4913	0.161 2094	0.161 0948
16	264 18 29.6	2 45 53.8	+12 23.0	-4 13 31.5	-16 11.6	9.667 8329	0.160 9376	0.160 7377
17	267 4 47.0	2 46 43.1	12 39.9	4 29 26.9	-15 39.0	9.666 9138	0.160 4948	0.160 2089
18	269 52 0.0	2 47 44.9	12 49.7	4 44 49.0	-15 4.8	9.665 7332	0.159 8796	0.159 5068
19	272 40 21.1	2 48 59.4	12 52.2	4 59 36.0	-14 28.9	9.664 2903	0.159 0901	0.158 6292
20	275 30 3.1	2 50 26.9	12 47.3	5 13 46.1	-13 51.0	9.662 5846	0.158 1237	0.157 5732
21	278 21 19.3	2 52 7.7	+12 34.7	-5 27 17.2	-13 10.8	9.660 6151	0.156 9772	0.156 3353
22	281 14 23.0	2 54 2.1	12 14.5	5 40 7.0	-12 28.3	9.658 3807	0.155 6468	0.154 9113
23	284 9 28.1	2 56 10.5	11 46.4	5 52 12.9	-11 43.1	9.655 8805	0.154 1281	0.153 2965
24	287 6 48.9	2 58 33.5	11 10.6	6 3 32.2	-10 55.0	9.653 1134	0.152 4158	0.151 4853
25	290 6 40.1	3 1 11.4	10 27.0	6 14 1.9	-10 3.7	9.650 0786	0.150 5043	0.149 4719
26	293 9 16.9	3 4 4.8	+9 35.8	-6 23 38.5	-9 8.8	9.646 7754	0.148 3871	0.147 2490
27	296 14 55.2	3 7 14.4	8 37.1	6 32 18.3	-8 10.0	9.643 2035	0.146 0566	0.144 8089
28	299 23 51.4	3 10 40.8	7 31.2	6 39 57.2	-7 7.0	9.639 3628	0.143 5047	0.142 1430
29	302 36 22.6	3 14 24.6	6 18.6	6 46 30.7	-5 59.3	9.635 2539	0.140 7224	0.139 2417
30	305 52 46.6	3 18 26.5	4 59.6	6 51 54.0	-4 46.4	9.630 8779	0.137 6995	0.136 0945
31	309 13 21.9	3 22 47.3	+3 35.0	-6 56 1.6	-3 27.9	9.626 2369	0.134 4252	0.132 6900
32	312 38 27.7	3 27 27.6	+2 5.5	-6 58 47.7	-2 3.3	9.621 3339	0.130 8872	0.129 0153

VENUS.

GREENWICH MEAN NOON.

Date.	Heliocentric Longitude, Mean Equinox of Date.	Daily Motion.	Reduction to Orbit.	Heliocentric Latitude.	Daily Motion.	Logarithm of Radius Vec- tor.	Logarithm of Earth		
							At Date.		
Jan.	0	119 14 43.4	1 37 24.9	+3 0.7	+2 19 49.2	+4 11.7	9.856 4263	9.600 1254	
	2	122 29 35.2	1 37 26.8	3 0.7	2 27 58.9	3 57.9	9.856 3991	9.614 3728	
	4	125 44 30.6	1 37 28.4	2 58.4	2 35 40.2	3 43.3	9.856 3812	9.628 4648	
	6	128 59 29.0	1 37 29.8	2 53.8	2 42 51.5	3 27.9	9.856 3728	9.642 3679	
	8	132 14 29.8	1 37 30.9	2 47.0	2 49 31.5	3 11.8	9.856 3738	9.656 0556	
	10	135 29 32.5	1 37 31.7	+2 38.0	+2 55 38.8	+2 55.2	9.856 3842	9.669 5082	
	12	138 44 36.3	1 37 32.1	2 27.0	3 1 12.2	2 38.0	9.856 4041	9.682 7116	
	14	141 59 40.7	1 37 32.2	2 14.1	3 6 10.6	2 20.3	9.856 4333	9.695 6565	
	16	145 14 45.0	1 37 32.0	1 59.5	3 10 33.1	2 2.1	9.856 4717	9.708 3384	
	18	148 29 48.5	1 37 31.4	1 43.3	3 14 18.8	1 43.5	9.856 5193	9.720 7565	
	20	151 44 50.6	1 37 30.5	+1 25.8	+3 17 27.0	+1 24.6	9.856 5758	9.732 9125	
	22	154 59 50.4	1 37 29.2	1 7.4	3 19 57.1	1 5.4	9.856 6410	9.744 8091	
	24	158 14 47.4	1 37 27.6	0 47.8	3 21 48.7	0 46.1	9.856 7148	9.756 4493	
	26	161 29 40.8	1 37 25.6	0 27.8	3 23 1.5	0 26.6	9.856 7970	9.767 8372	
	28	164 44 29.9	1 37 23.3	+0 7.4	3 23 35.2	+0 7.1	9.856 8871	9.778 9772	
	30	167 59 14.0	1 37 20.7	-0 13.1	+3 23 29.8	-0 12.5	9.856 9849	9.789 8735	
	Feb.	1	171 13 52.6	1 37 17.7	0 33.4	3 22 45.3	0 32.0	9.857 0902	9.800 5306
		3	174 28 24.8	1 37 14.4	0 53.2	3 21 22.0	0 51.3	9.857 2025	9.810 9526
		5	177 42 50.1	1 37 10.8	1 12.4	3 19 20.2	1 10.4	9.857 3215	9.821 1434
		7	180 57 7.9	1 37 6.9	1 30.6	3 16 40.3	1 29.3	9.857 4469	9.831 1070
		9	184 11 17.7	1 37 2.8	-1 47.7	+3 13 23.0	-1 47.9	9.857 5782	9.840 8482
		11	187 25 18.9	1 36 58.4	2 3.4	3 9 28.9	2 6.1	9.857 7149	9.850 3725
		13	190 39 11.1	1 36 53.7	2 17.5	3 4 58.8	2 23.8	9.857 8566	9.859 6859
		15	193 52 53.8	1 36 48.9	2 29.9	2 59 53.8	2 41.1	9.858 0030	9.868 7949
		17	197 6 26.7	1 36 43.9	2 40.3	2 54 14.8	2 57.8	9.858 1534	9.877 7064
		19	200 19 49.4	1 36 38.8	-2 48.7	+2 48 3.0	-3 13.9	9.858 3074	9.886 4273
		21	203 33 1.7	1 36 33.5	2 55.0	2 41 19.7	3 29.3	9.858 4645	9.894 9641
		23	206 46 3.3	1 36 28.1	2 59.1	2 34 6.2	3 44.0	9.858 6243	9.903 3227
		25	209 58 54.1	1 36 22.7	3 0.9	2 26 23.9	3 58.1	9.858 7862	9.911 5087
		27	213 11 33.9	1 36 17.2	3 0.5	2 18 14.4	4 11.3	9.858 9496	9.919 5273
Mar.		1	216 24 2.7	1 36 11.7	-2 57.8	+2 9 39.3	-4 23.7	9.859 1142	9.927 3833
	3	219 36 20.5	1 36 6.2	2 52.8	2 0 40.3	4 35.2	9.859 2793	9.935 0806	
	5	222 48 27.4	1 36 0.7	2 45.7	1 51 19.1	4 45.9	9.859 4444	9.942 6224	
	7	226 0 23.5	1 35 55.4	2 36.6	1 41 37.5	4 55.6	9.859 6091	9.950 0116	
	9	229 12 9.0	1 35 50.1	2 25.5	1 31 37.3	5 4.4	9.859 7727	9.957 2513	
	11	232 23 44.0	1 35 44.9	-2 12.6	+1 21 20.5	-5 12.2	9.859 9349	9.964 3445	
	13	235 35 8.8	1 35 39.9	1 58.0	1 10 49.2	5 19.0	9.860 0950	9.971 2949	
	15	238 46 23.7	1 35 35.1	1 42.0	1 0 5.1	5 24.9	9.860 2527	9.978 1066	
	17	241 57 29.2	1 35 30.4	1 24.8	0 49 10.3	5 29.7	9.860 4074	9.984 7835	
	19	245 8 25.5	1 35 25.9	1 6.6	0 38 6.9	5 33.5	9.860 5586	9.991 3300	
	21	248 19 13.1	1 35 21.7	-0 47.5	+0 26 56.9	-5 36.3	9.860 7059	9.997 7498	
	23	251 29 52.5	1 35 17.7	0 27.8	0 15 42.3	5 38.1	9.860 8489	0.004 0469	
	25	254 40 24.1	1 35 14.0	-0 7.8	+0 4 25.3	5 38.8	9.860 9870	0.010 2252	
	27	257 50 48.6	1 35 10.5	+0 12.2	-0 6 52.1	5 38.5	9.861 1199	0.016 2879	
	29	261 1 6.3	1 35 7.3	0 32.1	0 18 7.8	5 37.1	9.861 2472	0.022 2377	
31	264 11 17.9	1 35 4.4	+0 51.6	-0 29 19.8	-5 34.7	9.861 3685	0.028 0773		
Apr.	2	267 21 23.8	1 35 1.7	+1 10.4	-0 40 26.1	-5 31.4	9.861 4835	0.033 8087	

VENUS.

GREENWICH MEAN NOON.

Date.	Heliocentric Longitude, Mean Equinox of Date.	Daily Motion.	Reduction to Orbit.	Heliocentric Latitude.	Daily Motion.	Logarithm of Radius Vector.	Logarithm of Distance from Earth—	
							At Date.	At Intermediate Date.
Apr. 2	267 21 23.8	1 35 1.7	+1 10.4	-0 40 26.1	-5 31.4	9.861 4835	0.033 8087	0.036 6342
4	270 31 24.8	1 34 59.4	1 28.4	0 51 24.6	5 27.0	9.861 5917	0.039 4331	0.042 2055
6	273 41 21.4	1 34 57.4	1 45.3	1 2 13.3	5 21.6	9.861 6929	0.044 9516	0.047 6716
8	276 51 14.2	1 34 55.6	2 0.9	1 12 50.4	5 15.3	9.861 7868	0.050 3656	0.053 0338
10	280 1 3.7	1 34 54.1	2 15.0	1 23 14.0	5 8.1	9.861 8731	0.055 6765	0.058 2938
12	283 10 50.5	1 34 52.9	+2 27.5	-1 33 22.0	-4 59.9	9.861 9515	0.060 8862	0.063 4537
14	286 20 35.2	1 34 52.0	2 38.2	1 43 12.8	4 50.8	9.862 0218	0.065 9967	0.068 5156
16	289 30 18.4	1 34 51.4	2 46.9	1 52 44.6	4 40.9	9.862 0838	0.071 0104	0.073 4815
18	292 40 0.6	1 34 51.0	2 53.6	2 1 55.7	4 30.1	9.862 1374	0.075 9292	0.078 3539
20	295 49 42.4	1 34 50.9	2 58.2	2 10 44.4	4 18.5	9.862 1823	0.080 7558	0.083 1351
22	298 59 24.2	1 34 51.0	+3 0.6	-2 19 9.1	-4 6.1	9.862 2184	0.085 4920	0.087 8269
24	302 9 6.5	1 34 51.4	3 0.8	2 27 8.4	3 53.0	9.862 2457	0.090 1400	0.092 4315
26	305 18 49.8	1 34 52.0	2 58.9	2 34 40.8	3 39.2	9.862 2640	0.094 7016	0.096 9505
28	308 28 34.6	1 34 52.9	2 54.7	2 41 44.9	3 24.8	9.862 2733	0.099 1785	0.101 3856
30	311 38 21.3	1 34 53.9	2 48.4	2 48 19.5	3 9.7	9.862 2736	0.103 5719	0.105 7375
May 2	314 48 10.3	1 34 55.1	+2 40.1	-2 54 23.4	-2 54.1	9.862 2649	0.107 8824	0.110 0065
4	317 58 1.8	1 34 56.5	2 29.8	2 59 55.4	2 37.9	9.862 2472	0.112 1099	0.114 1928
6	321 7 56.4	1 34 58.1	2 17.7	3 4 54.6	2 21.3	9.862 2205	0.116 2551	0.118 2968
8	324 17 54.3	1 34 59.8	2 3.9	3 9 20.1	2 4.2	9.862 1849	0.120 3179	0.122 3186
10	327 27 55.8	1 35 1.7	1 48.6	3 13 11.0	1 46.7	9.862 1406	0.124 2990	0.126 2592
12	330 38 1.2	1 35 3.7	+1 32.0	-3 16 26.6	-1 28.9	9.862 0876	0.128 1994	0.130 1195
14	333 48 10.7	1 35 5.8	1 14.2	3 19 6.3	1 10.8	9.862 0262	0.132 0198	0.133 9005
16	336 58 24.6	1 35 8.1	0 55.5	3 21 9.5	0 52.4	9.861 9565	0.135 7617	0.137 6034
18	340 8 43.0	1 35 10.4	0 36.2	3 22 35.9	0 33.9	9.861 8787	0.139 4259	0.141 2293
20	343 19 6.2	1 35 12.8	+0 16.4	-3 23 25.2	-0 15.3	9.861 7930	0.143 0138	0.144 7795
22	346 29 34.3	1 35 15.3	-0 3.6	-3 23 37.1	+0 3.4	9.861 6997	0.146 5266	0.148 2553
24	349 40 7.4	1 35 17.9	0 23.6	3 23 11.6	0 22.1	9.861 5992	0.149 9658	0.151 6583
26	352 50 45.7	1 35 20.5	0 43.3	3 22 8.7	0 40.8	9.861 4917	0.153 3328	0.154 9893
28	356 1 29.4	1 35 23.2	1 2.5	3 20 28.5	0 59.3	9.861 3774	0.156 6280	0.158 2489
30	359 12 18.5	1 35 25.9	1 20.9	3 18 11.4	1 17.7	9.861 2567	0.159 8519	0.161 4371
June 1	2 23 13.1	1 35 28.7	-1 38.3	-3 15 17.6	+1 35.9	9.861 1301	0.163 0044	0.164 5539
3	5 34 13.3	1 35 31.5	1 54.5	3 11 47.6	1 53.9	9.860 9979	0.166 0855	0.167 5992
5	8 45 19.2	1 35 34.4	2 9.4	3 7 42.0	2 11.5	9.860 8604	0.169 0950	0.170 5729
7	11 56 30.9	1 35 37.3	2 22.7	3 3 1.5	2 28.8	9.860 7181	0.172 0328	0.173 4747
9	15 7 48.5	1 35 40.3	2 34.2	2 57 46.9	2 45.7	9.860 5715	0.174 8988	0.176 3051
11	18 19 12.0	1 35 43.3	-2 43.7	-2 51 59.1	+3 2.1	9.860 4209	0.177 6935	0.179 0641
13	21 30 41.6	1 35 46.3	2 51.3	2 45 39.0	3 17.9	9.860 2668	0.180 4171	0.181 7526
15	24 42 17.3	1 35 49.4	2 56.8	2 38 47.9	3 33.1	9.860 1098	0.183 0707	0.184 3714
17	27 53 59.1	1 35 52.5	3 0.0	2 31 27.0	3 47.7	9.859 9502	0.185 6548	0.186 9210
19	31 5 47.2	1 35 55.6	3 1.0	2 23 37.5	4 1.7	9.859 7886	0.188 1702	0.189 4025
21	34 17 41.7	1 35 58.8	-2 59.8	-2 15 20.8	+4 14.9	9.859 6254	0.190 6179	0.191 8166
23	37 29 42.7	1 36 2.1	2 56.3	2 6 38.4	4 27.3	9.859 4612	0.192 9988	0.194 1645
25	40 41 50.2	1 36 5.4	2 50.6	1 57 32.0	4 39.0	9.859 2965	0.195 3138	0.196 4469
27	43 54 4.2	1 36 8.7	2 42.8	1 48 3.1	4 49.8	9.859 1319	0.197 5637	0.198 6642
29	47 6 24.9	1 36 12.1	2 33.0	1 38 13.5	4 59.7	9.858 9677	0.199 7484	0.200 8162
July 1	50 18 52.5	1 36 15.5	-2 21.2	-1 28 5.0	+5 8.7	9.858 8046	0.201 8677	0.202 9028
3	53 31 26.9	1 36 18.9	-2 7.6	-1 17 39.4	+5 16.7	9.858 6430	0.203 9214	0.204 9236

VENUS.

GREENWICH MEAN NOON.

Date.	Heliocentric Longitude, Mean Equinox of Date.			Daily Motion.	Reduction to Orbit.			Heliocentric Latitude.			Daily Motion.	Logarithm of Radius Vec- tor.	Logarithm of Ea	
	"	"	"		"	"	"	"	"	"			At Date.	
July	1	50	18 52.5	1 36 15.5	-2	21.2	-1	28 5.0	+5	8.7	9.858 8046	0.201	8677	
	3	53	31 26.9	1 36 18.9	2	7.6	1	17 39.4	5	16.7	9.858 6430	0.203	9214	
	5	56	44 8.2	1 36 22.4	1	52.4	1	6 58.8	5	23.7	9.858 4834	0.205	9093	
	7	59	56 56.6	1 36 25.9	1	35.8	0	56 5.1	5	29.8	9.858 3263	0.207	8312	
	9	63	9 52.1	1 36 29.5	1	18.0	0	45 0.4	5	34.8	9.858 1724	0.209	6868	
	11	66	22 54.7	1 36 33.1	-0	59.2	-0	33 46.7	+5	38.7	9.858 0220	0.211	4764	
	13	69	36 4.5	1 36 36.7	0	39.6	0	22 26.1	5	41.6	9.857 8756	0.213	2005	
	15	72	49 21.4	1 36 40.3	-0	19.5	-0	11 0.8	5	43.5	9.857 7337	0.214	8596	
	17	76	2 45.6	1 36 43.9	+0	0.8	+0	0 27.1	5	44.2	9.857 5968	0.216	4542	
	19	79	16 17.0	1 36 47.5	0	21.1	0	11 55.2	5	43.8	9.857 4653	0.217	9852	
	21	82	29 55.5	1 36 51.1	+0	41.2	+0	23 21.5	+5	42.3	9.857 3396	0.219	4534	
	23	85	43 41.1	1 36 54.6	1	0.8	0	34 43.8	5	39.7	9.857 2201	0.220	8599	
	25	88	57 33.7	1 36 58.0	1	19.6	0	45 59.8	5	36.0	9.857 1073	0.222	2054	
	27	92	11 33.2	1 37 1.4	1	37.4	0	57 7.3	5	31.3	9.857 0015	0.223	4905	
	29	95	25 39.4	1 37 4.7	1	54.0	1	8 4.2	5	25.5	9.856 9030	0.224	7154	
	31	98	39 52.1	1 37 8.0	+2	9.2	+1	18 48.4	+5	18.6	9.856 8122	0.225	8799	
Aug.	2	101	54 11.2	1 37 11.1	2	22.7	1	29 17.8	5	10.6	9.856 7293	0.226	9837	
	4	105	8 36.3	1 37 14.0	2	34.3	1	39 30.3	5	1.6	9.856 6547	0.228	0268	
	6	108	23 7.1	1 37 16.8	2	44.0	1	49 23.9	4	51.7	9.856 5886	0.229	0093	
	8	111	37 43.4	1 37 19.4	2	51.6	1	58 56.6	4	40.8	9.856 5312	0.229	9311	
	10	114	52 24.7	1 37 21.8	+2	57.0	+2	8 6.6	+4	29.0	9.856 4827	0.230	7922	
	12	118	7 10.7	1 37 24.0	3	0.2	2	16 52.1	4	16.3	9.856 4432	0.231	5932	
	14	121	22 0.8	1 37 26.0	3	1.0	2	25 11.4	4	2.8	9.856 4130	0.232	3345	
	16	124	36 54.7	1 37 27.7	2	59.5	2	33 2.7	3	48.5	9.856 3921	0.233	0167	
	18	127	51 51.7	1 37 29.2	2	55.7	2	40 24.6	3	33.4	9.856 3805	0.233	6409	
	20	131	6 51.4	1 37 30.4	+2	49.6	+2	47 15.7	+3	17.6	9.856 3783	0.234	2081	
	22	134	21 53.1	1 37 31.3	2	41.4	2	53 34.5	3	1.1	9.856 3855	0.234	7193	
	24	137	36 56.3	1 37 31.8	2	31.1	2	59 19.8	2	44.1	9.856 4021	0.235	1754	
	26	140	52 0.3	1 37 32.0	2	18.8	3	4 30.5	2	26.6	9.856 4281	0.235	5769	
	28	144	7 4.4	1 37 31.9	2	4.8	3	9 5.6	2	8.6	9.856 4633	0.235	9239	
	30	147	22 7.9	1 37 31.5	+1	49.1	+3	13 4.2	+1	50.1	9.856 5077	0.236	2167	
Sept.	1	150	37 10.2	1 37 30.7	1	32.1	3	16 25.6	1	31.3	9.856 5610	0.236	4551	
	3	153	52 10.6	1 37 29.6	1	13.9	3	19 9.1	1	12.2	9.856 6232	0.236	6392	
	5	157	7 8.4	1 37 28.1	0	54.7	3	21 14.2	0	52.9	9.856 6939	0.236	7691	
	7	160	22 2.8	1 37 26.2	0	34.8	3	22 40.5	0	33.4	9.856 7731	0.236	8448	
	9	163	36 53.2	1 37 24.0	+0	14.5	+3	23 27.8	+0	13.9	9.856 8603	0.236	8663	
	11	166	51 38.8	1 37 21.5	-0	5.9	3	23 36.1	-0	5.7	9.856 9554	0.236	8339	
	13	170	6 19.1	1 37 18.7	0	26.3	3	23 5.3	0	25.2	9.857 0580	0.236	7482	
	15	173	20 53.3	1 37 15.5	0	46.4	3	21 55.5	0	44.6	9.857 1677	0.236	6101	
	17	176	35 20.9	1 37 12.0	1	5.8	3	20 7.1	1	3.8	9.857 2843	0.236	4205	
	19	179	49 41.2	1 37 8.2	-1	24.4	+3	17 40.4	-1	22.8	9.857 4074	0.236	1804	
	21	183	3 53.6	1 37 4.1	1	41.9	3	14 36.1	1	41.5	9.857 5365	0.235	8911	
	23	186	17 57.6	1 36 59.8	1	58.1	3	10 54.7	1	59.8	9.857 6712	0.235	5529	
Oct.	25	189	31 52.8	1 36 55.3	2	12.8	3	6 37.1	2	17.7	9.857 8110	0.235	1664	
	27	192	45 38.7	1 36 50.5	2	25.8	3	1 44.2	2	35.1	9.857 9556	0.234	7321	
	29	195	59 14.9	1 36 45.6	-2	36.9	+2	56 17.0	-2	52.0	9.858 1045	0.234	2500	
	1	199	12 47.0	1 36 40.5	-2	46.0	+2	50 16.5	-3	8.4	9.858 2572	0.233	7202	

VENUS.

GREENWICH MEAN NOON.

ite.	Heliocentric Longitude, Mean Equinox of Date.	Daily Motion.	Reduction to Orbit.	Heliocentric Latitude.	Daily Motion.	Logarithm of Radius Vec- tor.	Logarithm of Distance from Earth—	
							At Date.	At Interme- diate Date.
1	199 12 41.0	1 36 40.5	-2 46.0	+2 50 16.5	-3 8.4	9.858 2572	0.233 7202	0.233 4373
3	202 25 56.7	1 36 35.2	2 53.1	2 43 44.0	3 24.0	9.858 4132	0.233 1423	0.232 8353
5	205 39 1.9	1 36 29.9	2 57.9	2 36 40.9	3 39.0	9.858 5719	0.232 5164	0.232 1854
7	208 51 56.3	1 36 24.5	3 0.5	2 29 8.5	3 53.2	9.858 7330	0.231 8424	0.231 4874
9	212 4 39.8	1 36 19.0	3 0.9	2 21 8.3	4 6.7	9.858 8958	0.231 1204	0.230 7413
11	215 17 12.4	1 36 13.5	-2 59.0	+2 12 42.0	-4 19.4	9.859 0599	0.230 3502	0.229 9471
13	218 29 33.9	1 36 8.0	2 54.8	2 3 51.2	4 31.3	9.859 2247	0.229 5322	0.229 1055
15	221 41 44.5	1 36 2.6	2 48.4	1 54 37.5	4 42.3	9.859 3898	0.228 6673	0.228 2176
17	224 53 44.3	1 35 57.2	2 40.0	1 45 2.8	4 52.3	9.859 5546	0.227 7565	0.227 2842
19	228 5 33.3	1 35 51.9	2 29.6	1 35 9.0	5 1.4	9.859 7186	0.226 8007	0.226 3060
21	231 17 11.8	1 35 46.7	-2 17.3	+1 24 57.8	-5 9.6	9.859 8812	0.225 8002	0.225 2834
23	234 28 40.0	1 35 41.6	2 3.3	1 14 31.3	5 16.8	9.860 0421	0.224 7557	0.224 2170
25	237 39 58.3	1 35 36.7	1 47.8	1 3 51.4	5 22.9	9.860 2006	0.223 6674	0.223 1070
27	240 51 6.9	1 35 32.0	1 31.0	0 53 0.1	5 28.1	9.860 3563	0.222 5357	0.221 9536
29	244 2 6.3	1 35 27.5	1 13.0	0 41 59.5	5 32.3	9.860 5088	0.221 3605	0.220 7564
31	247 12 56.8	1 35 23.1	-0 54.2	+0 30 51.6	-5 35.4	9.860 6575	0.220 1413	0.219 5152
Nov. 2	250 23 38.9	1 35 19.0	0 34.7	0 19 38.4	5 37.5	9.860 8020	0.218 8781	0.218 2298
4	253 34 13.0	1 35 15.2	-0 14.8	+0 8 22.0	5 38.6	9.860 9418	0.217 5702	0.216 8993
6	256 44 39.8	1 35 11.7	+0 5.2	-0 2 55.5	5 38.7	9.861 0766	0.216 2171	0.215 5235
8	259 54 59.7	1 35 8.4	0 25.1	0 14 12.0	5 37.7	9.861 2059	0.214 8184	0.214 1018
10	263 5 13.3	1 35 5.3	+0 44.8	-0 25 25.6	-5 35.7	9.861 3293	0.213 3738	0.212 6344
12	266 15 21.1	1 35 2.5	1 3.9	0 36 34.1	5 32.6	9.861 4465	0.211 8836	0.211 1215
14	269 25 23.6	1 35 0.1	1 22.2	0 47 35.5	5 28.6	9.861 5571	0.210 3482	0.209 5637
16	272 35 21.6	1 34 58.0	1 39.5	0 58 27.9	5 23.6	9.861 6608	0.208 7680	0.207 9613
18	275 45 15.5	1 34 56.1	1 55.6	1 9 9.3	5 17.6	9.861 7573	0.207 1436	0.206 3149
20	278 55 6.0	1 34 54.5	+2 10.3	-1 19 37.7	-5 10.7	9.861 8463	0.205 4752	0.204 6246
22	282 4 53.6	1 34 52.2	2 23.3	1 29 51.4	5 2.8	9.861 9275	0.203 7630	0.202 8905
24	285 14 38.9	1 34 52.2	2 34.6	1 39 48.5	4 54.0	9.862 0006	0.202 0071	0.201 1126
26	288 24 22.4	1 34 51.5	2 44.1	1 49 27.1	4 44.4	9.862 0655	0.200 2070	0.199 2903
28	291 34 4.7	1 34 51.0	2 51.5	1 58 45.6	4 33.9	9.862 1220	0.198 3624	0.197 4233
30	294 43 46.4	1 34 50.8	+2 56.8	-2 7 42.3	-4 22.6	9.862 1699	0.196 4728	0.195 5107
Dec. 2	297 53 28.0	1 34 50.9	3 0.0	2 16 15.6	4 10.5	9.862 2091	0.194 5370	0.193 5517
4	301 3 10.0	1 34 51.2	3 1.0	2 24 23.9	3 57.6	9.862 2394	0.192 5546	0.191 5454
6	304 12 52.8	1 34 51.7	2 59.8	2 32 5.8	3 44.1	9.862 2608	0.190 5241	0.189 4905
8	307 22 36.9	1 34 52.5	2 56.4	2 39 20.0	3 29.9	9.862 2732	0.188 4445	0.187 3861
10	310 32 22.8	1 34 53.5	+2 50.9	-2 46 5.1	-3 15.0	9.862 2765	0.186 3152	0.185 2318
12	313 42 10.8	1 34 54.7	2 43.3	2 52 19.8	2 59.6	9.862 2708	0.184 1360	0.183 0276
14	316 52 1.3	1 34 56.0	2 33.6	2 58 3.1	2 43.6	9.862 2561	0.181 9067	0.180 7732
16	320 1 54.7	1 34 57.5	2 22.1	3 3 13.9	2 27.1	9.862 2325	0.179 6273	0.178 4689
18	323 11 51.3	1 34 59.2	2 8.9	3 7 51.2	2 10.2	9.862 1999	0.177 2980	0.176 1145
20	326 21 51.4	1 35 1.0	+1 54.1	-3 11 54.3	-1 52.8	9.862 1584	0.174 9184	0.173 7096
22	329 31 55.3	1 35 3.0	1 37.9	3 15 22.3	1 35.1	9.862 1083	0.172 4881	0.171 2537
24	332 42 3.3	1 35 5.1	1 20.6	3 18 14.6	1 17.1	9.862 0497	0.170 0065	0.168 7463
26	335 52 15.6	1 35 7.3	1 2.2	3 20 30.7	0 58.9	9.861 9827	0.167 4731	0.166 1867
28	339 2 32.4	1 35 9.6	0 43.0	3 22 10.0	0 40.4	9.861 9075	0.164 8869	0.163 5735
30	342 12 53.9	1 35 11.9	+0 23.3	-3 23 12.3	-0 21.8	9.861 8244	0.162 2464	0.160 9055
32	345 23 20.2	1 35 14.4	+0 3.4	-3 23 37.3	-0 3.2	9.861 7336	0.159 5504	0.158 1810

[Eph 15]

MARS.

GREENWICH MEAN NOON.

Date.	Heliocentric Longitude, Mean Equinox of Date.			Daily Motion.	Reduction to Orbit.	Heliocentric Latitude.			Daily Motion.	Logarithm of Radius Vector.	Logarithm of $\frac{1}{\text{Earth}}$	
	"	"	"			"	"	"			At Date.	
Jan.	0	275 47	9.4	35 1.44	+53.7	-1 21 3.2	-46.47	0.158 5328	0.384 3051			
	2	276 57	18.8	35 7.98	53.5	1 22 35.1	45.49	0.157 8631	0.383 8023			
	4	278 7 41.3	35 14.47	53.2	53.2	1 24 5.1	44.57	0.157 2011	0.383 2854			
	6	279 18 16.7	35 20.90	52.8	52.8	1 25 33.3	43.63	0.156 5471	0.382 7547			
	8	280 29 4.8	35 27.26	52.4	52.4	1 26 59.7	42.67	0.155 9014	0.382 2100			
	10	281 40 5.6	35 33.56	+51.8	+51.8	-1 28 24.0	-41.67	0.155 2643	0.381 6516			
	12	282 51 19.0	35 39.78	51.2	51.2	1 29 46.3	40.64	0.154 6361	0.381 0794			
	14	284 2 44.7	35 45.93	50.4	50.4	1 31 6.6	39.58	0.154 0174	0.380 4938			
	16	285 14 22.6	35 52.00	49.6	49.6	1 32 24.7	38.50	0.153 4082	0.379 8944			
	18	286 26 12.6	35 57.99	48.7	48.7	1 33 40.5	37.39	0.152 8091	0.379 2822			
	20	287 38 14.5	36 3.89	+47.7	+47.7	-1 34 54.2	-36.25	0.152 2203	0.378 6578			
	22	288 50 28.1	36 9.70	46.6	46.6	1 36 5.5	35.08	0.151 6423	0.378 0220			
	24	290 2 53.3	36 15.41	45.5	45.5	1 37 14.5	33.88	0.151 0752	0.377 3755			
	26	291 15 29.7	36 21.03	44.2	44.2	1 38 21.0	32.66	0.150 5195	0.376 7194			
	28	292 28 17.3	36 26.54	42.9	42.9	1 39 25.1	31.41	0.149 9754	0.376 0541			
	30	293 41 15.8	36 31.95	+41.5	+41.5	-1 40 26.7	-30.13	0.149 4433	0.375 3804			
Feb.	1	294 54 25.1	36 37.25	40.0	40.0	1 41 25.7	28.83	0.148 9235	0.374 6985			
	3	296 7 44.8	36 42.49	38.4	38.4	1 42 22.0	27.51	0.148 4163	0.374 0095			
	5	297 21 14.7	36 47.48	36.7	36.7	1 43 15.7	26.16	0.147 9221	0.373 3131			
	7	298 34 54.6	36 52.41	35.0	35.0	1 44 6.6	24.79	0.147 4410	0.372 6090			
	9	299 48 44.2	36 57.21	+33.2	+33.2	-1 44 54.8	-23.40	0.146 9736	0.371 8976			
	11	301 2 43.3	37 1.87	31.4	31.4	1 45 40.2	21.99	0.146 5199	0.371 1780			
	13	302 16 51.6	37 6.41	29.5	29.5	1 46 22.8	20.55	0.146 0803	0.370 4505			
	15	303 31 8.9	37 10.80	27.5	27.5	1 47 2.4	19.09	0.145 6551	0.369 7155			
	17	304 45 34.7	37 15.05	25.5	25.5	1 47 39.2	17.62	0.145 2445	0.368 9739			
	19	306 0 9.0	37 19.15	+23.4	+23.4	-1 48 12.9	-16.13	0.144 8488	0.368 2259			
Mar.	1	307 14 51.2	37 23.10	21.3	21.3	1 48 43.7	14.62	0.144 4683	0.367 4719			
	3	308 29 41.3	37 26.89	19.1	19.1	1 49 11.4	13.10	0.144 1032	0.366 7126			
	5	309 44 38.7	37 30.53	16.9	16.9	1 49 36.0	11.56	0.143 7538	0.365 9488			
	7	310 59 43.3	37 34.01	14.7	14.7	1 49 57.6	10.01	0.143 4202	0.365 1813			
	9	312 14 54.6	37 37.32	+12.4	+12.4	-1 50 16.1	-8.44	0.143 1028	0.364 4099			
	11	313 30 12.5	37 40.46	10.1	10.1	1 50 31.4	6.87	0.142 8017	0.363 6351			
	13	314 45 36.4	37 43.44	7.8	7.8	1 50 43.5	5.28	0.142 5171	0.362 8571			
	15	316 1 6.1	37 46.24	5.5	5.5	1 50 52.5	3.68	0.142 2493	0.362 0758			
	17	317 16 41.2	37 48.87	3.1	3.1	1 50 58.2	2.08	0.141 9982	0.361 2906			
	19	318 32 21.5	37 51.32	+0.7	+0.7	-1 51 0.7	-0.47	0.141 7644	0.360 5008			
Apr.	1	319 48 6.4	37 53.59	-1.7	-1.7	1 51 0.1	+1.15	0.141 5476	0.359 7060			
	3	321 3 55.7	37 55.68	4.1	4.1	1 50 56.1	2.77	0.141 3482	0.358 9067			
	5	322 19 49.0	37 57.58	6.4	6.4	1 50 49.0	4.40	0.141 1664	0.358 1029			
	7	323 35 45.9	37 59.30	8.8	8.8	1 50 38.5	6.02	0.141 0022	0.357 2947			
	9	324 51 46.1	38 0.83	-11.1	-11.1	-1 50 24.9	+7.65	0.140 8558	0.356 4827			
	11	326 7 49.1	38 2.17	13.4	13.4	1 50 7.9	9.27	0.140 7273	0.355 6668			
	13	327 23 54.6	38 3.32	15.7	15.7	1 49 47.8	10.88	0.140 6166	0.354 8477			
	15	328 40 2.2	38 4.28	18.0	18.0	1 49 24.4	12.49	0.140 5241	0.354 0257			
	17	329 56 11.5	38 5.04	20.2	20.2	1 48 57.8	14.10	0.140 4495	0.353 2007			
	19	331 12 22.2	38 5.62	-22.4	-22.4	-1 48 28.0	+15.71	0.140 3931	0.352 3736			
Apr. 21	332 28 33.9	38 6.00	-24.5	-24.5	-1 47 54.9	+17.31	0.140 3549	0.351 5435				

[Eph 13]

MARS.

GREENWICH MEAN NOON.

ate.	Heliocentric Longitude, Mean Equinox of Date.			Daily Motion.	Reduction to Orbit.	Heliocentric Latitude.			Daily Motion.	Logarithm of Radius Vector.	Logarithm of Distance from Earth—	
	"	"	"			"	"	At Date.			At Intermediate Date.	
r.	2	332 28 33.9	38 6.00	-24.5	-1 47 54.9	+17.31	0.140 3549	0.351 5435	0.351 1274			
	4	333 44 46.1	38 6.19	26.6	1 47 18.7	18.89	0.140 3348	0.350 7106	0.350 2926			
	6	335 0 58.5	38 6.18	28.7	1 46 39.3	20.47	0.140 3331	0.349 8734	0.349 4531			
	8	336 17 10.7	38 5.98	30.7	1 45 56.8	22.04	0.140 3495	0.349 0316	0.348 6088			
	10	337 33 22.3	38 5.59	32.6	1 45 11.2	23.59	0.140 3842	0.348 1845	0.347 7588			
	12	338 49 32.8	38 5.00	-34.4	-1 44 22.5	+25.13	0.140 4370	0.347 3316	0.346 9031			
	14	340 5 42.1	38 4.22	36.2	1 43 30.7	26.65	0.140 5080	0.346 4732	0.346 0416			
	16	341 21 49.5	38 3.25	37.9	1 42 35.9	28.15	0.140 5971	0.345 6084	0.345 1734			
	18	342 37 54.9	38 2.08	39.6	1 41 38.1	29.64	0.140 7042	0.344 7369	0.344 2991			
	20	343 53 57.7	38 0.73	41.2	1 40 37.3	31.11	0.140 8293	0.343 8598	0.343 4189			
May	22	345 9 57.7	37 59.18	-42.7	-1 39 33.7	+32.55	0.140 9722	0.342 9766	0.342 5328			
	24	346 25 54.3	37 57.45	44.1	1 38 27.1	33.97	0.141 1329	0.342 0875	0.341 6408			
	26	347 41 47.3	37 55.53	45.4	1 37 17.8	35.38	0.141 3113	0.341 1925	0.340 7428			
	28	348 57 36.3	37 53.43	46.6	1 36 5.6	36.75	0.141 5072	0.340 2915	0.339 8386			
	30	350 13 20.9	37 51.15	47.8	1 34 50.8	38.11	0.141 7205	0.339 3840	0.338 9278			
	2	351 29 0.8	37 48.69	-48.8	-1 33 33.2	+39.44	0.141 9511	0.338 4699	0.338 0096			
	4	352 44 35.6	37 46.06	49.8	1 32 13.1	40.74	0.142 1988	0.337 5473	0.337 0829			
	6	354 0 4.9	37 43.25	50.6	1 30 50.3	42.01	0.142 4634	0.336 6162	0.336 1471			
	8	355 15 28.5	37 40.26	51.3	1 29 25.0	43.26	0.142 7448	0.335 6754	0.335 2009			
	10	356 30 45.9	37 37.13	51.9	1 27 57.3	44.47	0.143 0426	0.334 7237	0.334 2435			
	12	357 45 56.9	37 33.81	-52.5	-1 26 27.2	+45.65	0.143 3570	0.333 7604	0.333 2743			
	14	359 1 1.1	37 30.34	52.9	1 24 54.7	46.80	0.143 6874	0.332 7853	0.332 2932			
	16	0 15 58.1	37 26.71	53.3	1 23 20.0	47.93	0.144 0338	0.331 7980	0.331 2997			
	18	1 30 47.8	37 22.91	53.5	1 21 43.0	49.02	0.144 3959	0.330 7982	0.330 2935			
	20	2 45 29.7	37 18.96	53.7	1 20 3.9	50.08	0.144 7735	0.329 7856	0.329 2745			
	22	4 0 3.5	37 14.86	-53.7	-1 18 22.7	+51.11	0.145 1662	0.328 7602	0.328 2427			
	24	5 14 29.0	37 10.61	53.7	1 16 39.5	52.10	0.145 5739	0.327 7219	0.327 1977			
	26	6 28 45.9	37 6.22	53.5	1 14 54.3	53.06	0.145 9963	0.326 6703	0.326 1394			
	28	7 42 53.8	37 1.70	53.3	1 13 7.3	53.98	0.146 4332	0.325 6050	0.325 0672			
	30	8 56 52.6	36 57.04	52.9	1 11 18.4	54.87	0.146 8842	0.324 5257	0.323 9800			
une	1	10 10 41.9	36 52.25	-52.5	-1 9 27.8	+55.72	0.147 3491	0.323 4301	0.322 8762			
	3	11 24 21.5	36 47.33	51.9	1 7 35.5	56.54	0.147 8276	0.322 3180	0.321 7551			
	5	12 37 51.2	36 42.29	51.3	1 5 41.6	57.32	0.148 3193	0.321 1876	0.320 6154			
	7	13 51 10.6	36 37.13	50.6	1 3 46.2	58.07	0.148 8241	0.320 0383	0.319 4560			
	9	15 4 19.6	36 31.85	49.8	1 1 49.3	58.78	0.149 3415	0.318 8685	0.318 2758			
	11	16 17 17.9	36 26.46	-48.9	-0 59 51.0	+59.46	0.149 8713	0.317 6778	0.317 0744			
	13	17 30 5.4	36 20.97	47.9	0 57 51.4	60.10	0.150 4131	0.316 4655	0.315 8511			
	15	18 42 41.7	36 15.37	46.8	0 55 50.6	60.71	0.150 9666	0.315 2311	0.314 6055			
	17	19 55 6.8	36 9.68	45.6	0 53 48.6	61.29	0.151 5316	0.313 9741	0.313 3369			
	19	21 7 20.3	36 3.89	44.4	0 51 45.4	61.83	0.152 1076	0.312 6940	0.312 0452			
	21	22 19 22.3	35 58.01	-43.1	-0 49 41.3	+62.33	0.152 6944	0.311 3907	0.310 7304			
	23	23 31 12.3	35 52.05	41.7	0 47 36.1	62.80	0.153 2915	0.310 0641	0.309 3919			
	25	24 42 50.4	35 46.01	40.2	0 45 30.1	63.23	0.153 8989	0.308 7133	0.308 0286			
	27	25 54 16.3	35 39.89	38.7	0 43 23.3	63.62	0.154 5159	0.307 3375	0.306 6400			
	29	27 5 29.9	35 33.69	37.1	0 41 15.6	63.98	0.155 1424	0.305 9358	0.305 2247			
	1	28 16 31.0	35 27.42	-35.5	-0 39 7.4	+64.31	0.155 7777	0.304 5065	0.303 7811			
	3	29 27 19.5	35 21.08	-33.8	-0 36 58.4	+64.60	0.156 4221	0.303 0484	0.302 3079			
	uly	1	28 16 31.0	35 27.42	-35.5	-0 39 7.4	+64.31	0.155 7777	0.304 5065	0.303 7811		
		3	29 27 19.5	35 21.08	-33.8	-0 36 58.4	+64.60	0.156 4221	0.303 0484	0.302 3079		

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GREENWICH MEAN NOON.

Date.	Heliocentric Longitude, Mean Epoch of Date.			Reduction to Orbit.	Heliocentric Latitude.			Daily Motion.	Logarithm of Radius Vector.	Logarithm of Earth's Distance.	
	"	"	"		"	"	"			At Date.	
July	1	28 16	31.0	35 27.42	-35.5	0 39 7.4	+64.31	0.155 7777	0.304 506		
	3	29 27	19.5	35 21.08	33.8	0 36 58.4	64.60	0.156 4221	0.303 048		
	5	30 37	55.3	35 14.68	32.0	0 34 48.9	64.86	0.157 0745	0.301 559		
	7	31 48	18.2	35 8.23	30.2	0 32 39.0	65.08	0.157 7352	0.300 038		
	9	32 58	28.2	35 1.73	28.4	0 30 28.7	65.28	0.158 4035	0.298 485		
	11	34 8	25.1	34 55.18	-26.5	0 28 17.9	+65.44	0.159 0792	0.296 898		
	13	35 18	8.9	34 48.58	24.6	0 26 6.9	65.57	0.159 7619	0.295 277		
	15	36 27	39.4	34 41.94	22.6	0 23 55.7	65.67	0.160 4512	0.293 621		
	17	37 36	56.6	34 35.26	20.6	0 21 44.2	65.74	0.161 1469	0.291 930		
	19	38 46	0.4	34 28.55	18.6	0 19 32.7	65.78	0.161 8485	0.290 202		
	21	39 54	50.8	34 21.81	-16.6	0 17 21.2	+65.79	0.162 5558	0.288 438		
	23	41 3	27.7	34 15.04	14.6	0 15 9.6	65.76	0.163 2685	0.286 638		
	25	42 11	51.0	34 8.23	12.5	0 12 58.1	65.71	0.163 9861	0.284 799		
	27	43 20	0.7	34 1.44	10.4	0 10 46.8	65.63	0.164 7084	0.282 921		
	29	44 27	56.7	33 54.62	8.3	0 8 35.6	65.53	0.165 4351	0.281 003		
	31	45 35	39.1	33 47.78	-6.2	0 6 24.7	+65.40	0.166 1657	0.279 043		
Aug.	2	46 43	7.8	33 40.93	4.1	0 4 14.1	65.24	0.166 9001	0.277 039		
	4	47 50	22.8	33 34.07	-2.0	0 2 3.8	65.05	0.167 6377	0.274 989		
	6	48 57	24.0	33 27.20	+0.1	+0 0 6.1	64.84	0.168 3786	0.272 893		
	8	50 4	11.6	33 20.34	2.2	0 2 15.6	64.60	0.169 1219	0.270 749		
	10	51 10	45.4	33 13.48	+4.3	+0 4 24.5	+64.34	0.169 8677	0.268 556		
	12	52 17	5.5	33 6.63	6.3	0 6 32.9	64.06	0.170 6158	0.266 314		
	14	53 23	11.9	32 59.80	8.4	0 8 40.8	63.76	0.171 3655	0.264 021		
	16	54 29	4.7	32 52.96	10.4	0 10 47.9	63.43	0.172 1169	0.261 677		
	18	55 34	43.8	32 46.14	12.4	0 12 54.5	63.09	0.172 8694	0.259 282		
	20	56 40	9.3	32 39.34	+14.4	+0 15 0.2	+62.72	0.173 6229	0.256 835		
	22	57 45	21.1	32 32.56	16.4	0 17 5.3	62.33	0.174 3771	0.254 335		
	24	58 50	19.5	32 25.80	18.3	0 19 9.5	61.92	0.175 1316	0.251 781		
	26	59 55	4.4	32 19.07	20.2	0 21 13.0	61.49	0.175 8862	0.249 172		
	28	60 59	35.8	32 12.36	22.0	0 23 15.5	61.04	0.176 6406	0.246 504		
	30	62 3	53.8	32 5.67	+23.8	+0 25 17.1	+60.57	0.177 3945	0.243 777		
Sept.	1	63 7	58.5	31 59.02	25.6	0 27 17.7	60.09	0.178 1477	0.240 988		
	3	64 11	49.9	31 52.39	27.4	0 29 17.4	59.59	0.178 8999	0.238 137		
	5	65 15	28.1	31 45.81	29.1	0 31 16.1	59.07	0.179 6509	0.235 221		
	7	66 18	53.2	31 39.26	30.7	0 33 13.7	58.54	0.180 4004	0.232 241		
	9	67 22	5.2	31 32.76	+32.3	+0 35 10.2	+57.99	0.181 1481	0.229 193		
	11	68 25	4.3	31 26.29	33.8	0 37 5.6	57.43	0.181 8938	0.226 077		
	13	69 27	50.4	31 19.86	35.3	0 38 59.9	56.85	0.182 6373	0.222 894		
	15	70 30	23.8	31 13.49	36.8	0 40 53.0	56.26	0.183 3783	0.219 642		
	17	71 32	44.5	31 7.16	38.2	0 42 44.9	55.66	0.184 1167	0.216 321		
	19	72 34	52.5	31 0.87	+39.5	+0 44 35.5	+55.05	0.184 8521	0.212 929		
	21	73 36	48.0	30 54.64	40.8	0 46 25.1	54.42	0.185 5844	0.209 465		
	23	74 38	31.1	30 48.45	42.0	0 48 13.3	53.78	0.186 3133	0.205 928		
	25	75 40	1.8	30 42.31	43.2	0 50 0.2	53.13	0.187 0387	0.202 316		
	27	76 41	20.4	30 36.23	44.3	0 51 45.8	52.47	0.187 7603	0.198 626		
	29	77 42	26.8	30 30.20	+45.3	+0 53 30.1	+51.80	0.188 4779	0.194 856		
Oct.	1	78 43	21.2	30 24.22	+46.3	+0 55 13.0	+51.11	0.189 1913	0.191 006		

MARS.

GREENWICH MEAN NOON.

Date.	Heliocentric Longitude, Mean Equinox of Date.			Daily Motion.	Reduction to Orbit.	Heliocentric Latitude.			Daily Motion.	Logarithm of Radius Vector.	Logarithm of Distance from Earth—	
	"	"	"			"	"	"			At Date.	At Intermediate Date.
Oct. 1	78 43	21.2	30 24.22	+46.3	+0 55	13.0	+51.11	0.189 1913	0.191 0062	0.189 0499		
3	79 44	3.7	30 18.30	47.3	0 56	54.5	50.42	0.189 9004	0.187 0726	0.185 0742		
5	80 44	34.4	30 12.44	48.2	0 58	34.6	49.72	0.190 6049	0.183 0546	0.181 0135		
7	81 44	53.5	30 6.64	49.0	1 0	13.4	49.01	0.191 3047	0.178 9508	0.176 8665		
9	82 45	1.0	30 0.91	49.7	1 1	50.7	48.30	0.191 9995	0.174 7604	0.172 6325		
11	83 44	57.2	29 55.23	+50.4	+1 3	26.6	+47.58	0.192 6892	0.170 4828	0.168 3111		
13	84 44	42.0	29 49.61	51.0	1 5	1.0	46.85	0.193 3736	0.166 1174	0.163 9016		
15	85 44	15.7	29 44.06	51.6	1 6	34.0	46.11	0.194 0526	0.161 6637	0.159 4037		
17	86 43	38.3	29 38.57	52.1	1 8	5.5	45.37	0.194 7260	0.157 1214	0.154 8164		
19	87 42	50.0	29 33.14	52.5	1 9	35.5	44.62	0.195 3936	0.152 4885	0.150 1378		
21	88 41	50.9	29 27.78	+52.9	+1 11	3.9	+43.86	0.196 0553	0.147 7638	0.145 3664		
23	89 40	41.1	29 22.48	53.2	1 12	30.9	43.10	0.196 7108	0.142 9454	0.140 5004		
25	90 39	20.9	29 17.26	53.4	1 13	56.3	42.33	0.197 3601	0.138 0313	0.135 5378		
27	91 37	50.2	29 12.09	53.6	1 15	20.2	41.56	0.198 0030	0.133 0199	0.130 4772		
29	92 36	9.2	29 7.00	53.7	1 16	42.6	40.78	0.198 6394	0.127 9097	0.125 3170		
31	93 34	18.2	29 1.97	+53.8	+1 18	3.3	+40.00	0.199 2692	0.122 6990	0.120 0555		
Nov. 2	94 32	17.1	28 57.01	53.8	1 19	22.6	39.21	0.199 8921	0.117 3864	0.114 6916		
4	95 30	6.2	28 52.12	53.7	1 20	40.2	38.42	0.200 5081	0.111 9712	0.109 2251		
6	96 27	45.6	28 47.29	53.6	1 21	56.3	37.63	0.201 1170	0.106 4536	0.103 6563		
8	97 25	15.5	28 42.54	53.4	1 23	10.7	36.84	0.201 7188	0.100 8333	0.097 9849		
10	98 22	35.8	28 37.86	+53.1	+1 24	23.6	+36.04	0.202 3132	0.095 1111	0.092 2120		
12	99 19	47.0	28 33.26	52.8	1 25	34.9	35.24	0.202 9003	0.089 2878	0.086 3384		
14	100 16	48.9	28 28.72	52.4	1 26	44.6	34.44	0.203 4797	0.083 3639	0.080 3646		
16	101 13	41.9	28 24.26	52.0	1 27	52.6	33.63	0.204 0516	0.077 3402	0.074 2906		
18	102 10	26.0	28 19.87	51.5	1 28	59.1	32.82	0.204 6156	0.071 2158	0.068 1158		
20	103 7	1.4	28 15.55	+51.0	+1 30	3.9	+32.01	0.205 1718	0.064 9904	0.061 8401		
22	104 3	28.2	28 11.30	50.4	1 31	7.1	31.20	0.205 7200	0.058 6650	0.055 4648		
24	104 59	46.7	28 7.13	49.8	1 32	8.7	30.38	0.206 2602	0.052 2398	0.048 9899		
26	105 55	56.8	28 3.03	49.1	1 33	8.7	29.57	0.206 7921	0.045 7154	0.042 4164		
28	106 51	58.9	27 59.00	48.4	1 34	7.0	28.75	0.207 3159	0.039 0930	0.035 7455		
30	107 47	52.9	27 55.05	+47.6	+1 35	3.7	+27.94	0.207 8312	0.032 3743	0.028 9802		
Dec. 2	108 43	39.1	27 51.17	46.7	1 35	58.7	27.12	0.208 3382	0.025 5637	0.022 1245		
4	109 39	17.6	27 47.36	45.8	1 36	52.1	26.30	0.208 8366	0.018 6637	0.015 1819		
6	110 34	48.6	27 43.63	44.9	1 37	43.9	25.48	0.209 3265	0.011 6800	0.008 1583		
8	111 30	12.2	27 39.97	43.9	1 38	34.1	24.66	0.209 8076	0.004 6185	0.001 0613		
10	112 25	28.5	27 36.39	+42.9	+1 39	22.6	+23.84	0.210 2800	9.997 4873	9.993 8973		
12	113 20	37.8	27 32.88	41.9	1 40	9.4	23.02	0.210 7436	9.990 2925	9.986 6741		
14	114 15	40.1	27 29.45	40.8	1 40	54.7	22.20	0.211 1982	9.983 0428	9.979 3995		
16	115 10	35.6	27 26.09	39.7	1 41	38.2	21.38	0.211 6438	9.975 7452	9.972 0815		
18	116 5	24.5	27 22.81	38.5	1 42	20.2	20.56	0.212 0804	9.968 4092	9.964 7297		
20	117 0	6.9	27 19.59	+37.3	+1 43	0.5	+19.74	0.212 5078	9.961 0445	9.957 3547		
22	117 54	42.9	27 16.46	36.0	1 43	39.2	18.92	0.212 9260	9.953 6619	9.949 9680		
24	118 49	12.8	27 13.41	34.7	1 44	16.2	18.10	0.213 3350	9.946 2746	9.942 5831		
26	119 43	36.6	27 10.41	33.4	1 44	51.6	17.29	0.213 7348	9.938 8958	9.935 2150		
28	120 37	54.5	27 7.49	32.0	1 45	25.3	16.47	0.214 1251	9.931 5426	9.927 8809		
30	121 32	6.6	27 4.66	+30.6	+1 45	57.5	+15.65	0.214 5060	9.924 2326	9.920 6005		
32	122 26	13.2	27 1.91	+29.2	+1 46	28.0	+14.83	0.214 8774	9.916 9874	9.913 3960		

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GREENWICH MEAN NOON.

Date.	Heliocentric Longitude, Mean Equinox of Date.			Daily Motion.	Reduction to Orbit.	Heliocentric Latitude.			Daily Motion.	Logarithm of Radius Vector.	Logarithm of I Earth	
	"	"	"			"	"	"			At Date.	
Jan.	0	330	0 6.5	5 21.81	+26.4	-1	0 32.8	-4.68	0.700 2102	0.754 6854		
	4	330	21 34.0	5 21.94	26.3	1	0 51.4	4.65	0.700 1248	0.757 8388		
	8	330	43 2.1	5 22.07	26.3	1	1 9.9	4.61	0.700 0400	0.760 7687		
	12	331	4 30.6	5 22.19	26.2	1	1 28.3	4.58	0.699 9558	0.763 4710		
	16	331	25 59.6	5 22.32	26.1	1	1 46.5	4.54	0.699 8721	0.765 9408		
	20	331	47 20.2	5 22.44	+26.0	-1	2 4.6	-4.51	0.699 7890	0.768 1743		
Feb.	24	332	8 59.2	5 22.56	26.0	1	2 22.6	4.47	0.699 7064	0.770 1697		
	28	332	30 29.7	5 22.69	25.9	1	2 40.4	4.44	0.699 6244	0.771 9264		
	1	332	52 0.7	5 22.81	25.8	1	2 58.1	4.40	0.699 5429	0.773 4445		
	5	333	13 32.1	5 22.93	25.7	1	3 15.7	4.37	0.699 4621	0.774 7237		
	9	333	35 4.1	5 23.05	+25.6	-1	3 33.1	-4.33	0.699 3819	0.775 7627		
	13	333	56 36.5	5 23.17	25.5	1	3 50.3	4.30	0.699 3022	0.776 5595		
Mar.	17	334	18 9.4	5 23.29	25.4	1	4 7.4	4.26	0.699 2232	0.777 1125		
	21	334	39 42.8	5 23.41	25.2	1	4 24.4	4.22	0.699 1447	0.777 4225		
	25	335	1 16.7	5 23.52	25.1	1	4 41.2	4.19	0.699 0669	0.777 4911		
	1	335	22 51.0	5 23.64	+25.0	-1	4 57.9	-4.15	0.698 9897	0.777 3199		
	5	335	44 25.8	5 23.75	24.9	1	5 14.4	4.12	0.698 9131	0.776 9108		
	9	336	6 1.0	5 23.87	24.7	1	5 30.8	4.08	0.698 8371	0.776 2633		
Apr.	13	336	27 36.7	5 23.98	24.6	1	5 47.1	4.04	0.698 7618	0.775 3778		
	17	336	49 12.9	5 24.09	24.5	1	6 3.2	4.00	0.698 6871	0.774 2542		
	21	337	10 49.5	5 24.21	+24.3	-1	6 19.1	-3.96	0.698 6130	0.772 8945		
	25	337	32 26.5	5 24.32	24.2	1	6 34.9	3.92	0.698 5396	0.771 3018		
	29	337	54 4.0	5 24.43	24.0	1	6 50.5	3.89	0.698 4668	0.769 4791		
	2	338	15 42.0	5 24.54	23.9	1	7 6.0	3.85	0.698 3946	0.767 4296		
May	6	338	37 20.3	5 24.64	23.7	1	7 21.3	3.81	0.698 3230	0.765 1547		
	10	338	58 59.1	5 24.75	+23.6	-1	7 36.5	-3.77	0.698 2521	0.762 6556		
	14	339	20 38.3	5 24.86	23.4	1	7 51.5	3.73	0.698 1819	0.759 9344		
	18	339	42 18.0	5 24.96	23.2	1	8 6.3	3.69	0.698 1123	0.756 9945		
	22	340	3 58.0	5 25.07	23.0	1	8 21.0	3.65	0.698 0433	0.753 8409		
	26	340	25 38.5	5 25.17	22.9	1	8 35.5	3.61	0.697 9750	0.750 4791		
June	30	340	47 19.4	5 25.27	+22.7	-1	8 49.9	-3.57	0.697 9074	0.746 9141		
	4	341	9 0.7	5 25.37	22.5	1	9 4.1	3.53	0.697 8404	0.743 1498		
	8	341	30 42.4	5 25.47	22.3	1	9 18.2	3.49	0.697 7741	0.739 1901		
	12	341	52 24.5	5 25.57	22.1	1	9 32.1	3.45	0.697 7085	0.735 0398		
	16	342	14 7.0	5 25.67	21.9	1	9 45.8	3.41	0.697 6436	0.730 7064		
	20	342	35 49.9	5 25.77	+21.7	-1	9 59.4	-3.37	0.697 5793	0.726 1982		
July	24	342	57 33.1	5 25.86	21.5	1	10 12.8	3.33	0.697 5157	0.721 5252		
	28	343	19 16.8	5 25.96	21.3	1	10 26.1	3.29	0.697 4527	0.716 6970		
	1	343	41 0.8	5 26.05	21.1	1	10 39.2	3.25	0.697 3905	0.711 7230		
	5	344	2 45.2	5 26.15	20.9	1	10 52.1	3.21	0.697 3290	0.706 6121		
	9	344	24 30.0	5 26.24	+20.7	-1	11 4.8	-3.17	0.697 2681	0.701 3760		
	13	344	46 15.1	5 26.33	20.5	1	11 17.4	3.12	0.697 2080	0.696 0289		
August	17	345	8 0.6	5 26.42	20.3	1	11 29.8	3.08	0.697 1485	0.690 5878		
	21	345	29 46.5	5 26.51	20.0	1	11 42.0	3.04	0.697 0897	0.685 0706		
	25	345	51 32.7	5 26.60	19.8	1	11 54.1	3.00	0.697 0317	0.679 4966		
	29	346	13 19.3	5 26.68	+19.6	-1	12 6.0	-2.95	0.696 9743	0.673 8841		
	3	346	35 6.2	5 26.77	+19.3	-1	12 17.8	-2.91	0.696 9176	0.668 2530		

(Eph 13)

JUPITER.

GREENWICH MEAN NOON.

Date.	Heliocentric Longitude, Mean Equinox of Date.			Daily Motion.	Reduction to Orbit.	Heliocentric Latitude.			Daily Motion.	Logarithm of Radius Vector.	Logarithm of Distance from Earth—	
											At Date.	At Intermediate Date.
July 3	346	35	6.2	5 26.77	+19.3	-1 12	17.8	-2.92	0.696 9176	0.668 2530	0.665 4375	
7	346	56	53.5	5 26.86	19.1	1 12	29.3	2.87	0.696 8616	0.662 6263	0.659 8228	
11	347	18	41.1	5 26.94	18.9	1 12	40.7	2.83	0.696 8064	0.657 0306	0.654 2534	
15	347	40	29.0	5 27.02	18.6	1 12	51.9	2.78	0.696 7519	0.651 4950	0.648 7594	
19	348	2	17.2	5 27.10	18.4	1 13	3.0	2.74	0.696 6981	0.646 0506	0.643 3725	
23	348	24	5.8	5 27.18	+18.1	-1 13	13.9	-2.70	0.696 6450	0.640 7291	0.638 1241	
27	348	45	54.7	5 27.26	17.9	1 13	24.6	2.65	0.696 5926	0.635 5614	0.633 0451	
31	349	7	43.9	5 27.34	17.6	1 13	35.1	2.61	0.696 5410	0.630 5795	0.628 1689	
Aug. 4	349	29	33.5	5 27.42	17.4	1 13	45.4	2.56	0.696 4901	0.625 8180	0.623 5314	
8	349	51	23.3	5 27.50	17.1	1 13	55.6	2.52	0.696 4399	0.621 3139	0.619 1704	
12	350	13	13.4	5 27.57	+16.8	-1 14	5.6	-2.48	0.696 3905	0.617 1056	0.615 1242	
16	350	35	3.8	5 27.64	16.6	1 14	15.4	2.43	0.696 3418	0.613 2306	0.611 4289	
20	350	56	54.6	5 27.72	16.3	1 14	25.1	2.39	0.696 2938	0.609 7232	0.608 1174	
24	351	18	45.6	5 27.79	16.0	1 14	34.5	2.34	0.696 2466	0.606 6151	0.605 2196	
28	351	40	36.8	5 27.86	15.7	1 14	43.8	2.30	0.696 2001	0.603 9345	0.602 7634	
Sept. 1	352	2	28.4	5 27.93	+15.5	-1 14	52.9	-2.25	0.696 1544	0.601 7095	0.600 7760	
5	352	24	20.3	5 28.00	15.2	1 15	1.8	2.21	0.696 1094	0.599 9657	0.599 2813	
9	352	46	12.4	5 28.06	14.9	1 15	10.6	2.16	0.696 0651	0.598 7251	0.598 2988	
13	353	8	4.8	5 28.13	14.6	1 15	19.2	2.12	0.696 0216	0.598 0038	0.597 8410	
17	353	29	57.5	5 28.20	14.3	1 15	27.6	2.07	0.695 9789	0.597 8108	0.597 9128	
21	353	51	50.4	5 28.26	+14.0	-1 15	35.8	-2.03	0.695 9369	0.598 1468	0.598 5121	
25	354	13	43.6	5 28.32	13.7	1 15	43.8	1.98	0.695 8957	0.599 0080	0.599 6334	
29	354	35	37.0	5 28.39	13.4	1 15	51.6	1.94	0.695 8552	0.600 3869	0.601 2670	
Oct. 3	354	57	30.6	5 28.45	13.1	1 15	59.3	1.89	0.695 8154	0.602 2718	0.603 3991	
7	355	19	24.5	5 28.50	12.8	1 16	6.7	1.84	0.695 7765	0.604 6462	0.606 0102	
11	355	41	18.7	5 28.56	+12.5	-1 16	14.0	-1.80	0.695 7383	0.607 4877	0.609 0746	
15	356	3	13.0	5 28.62	12.2	1 16	21.1	1.75	0.695 7009	0.610 7669	0.612 5602	
19	356	25	7.6	5 28.68	11.9	1 16	28.0	1.71	0.695 6643	0.614 4502	0.616 4325	
23	356	47	2.4	5 28.73	11.6	1 16	34.8	1.66	0.695 6284	0.618 5026	0.620 6562	
27	357	8	57.5	5 28.78	11.3	1 16	41.3	1.61	0.695 5933	0.622 8890	0.625 1967	
31	357	30	52.7	5 28.84	+11.0	-1 16	47.7	-1.57	0.695 5590	0.627 5747	0.630 0182	
Nov. 4	357	52	48.2	5 28.89	10.7	1 16	53.8	1.52	0.695 5255	0.632 5227	0.635 0837	
8	358	14	43.8	5 28.94	10.4	1 16	59.8	1.47	0.695 4928	0.637 6964	0.640 3556	
12	358	36	39.7	5 28.99	10.0	1 17	5.6	1.43	0.695 4608	0.643 0563	0.645 7938	
16	358	58	35.7	5 29.03	9.7	1 17	11.2	1.38	0.695 4296	0.648 5638	0.651 3617	
20	359	20	31.9	5 29.08	+ 9.4	-1 17	16.7	-1.33	0.695 3992	0.654 1831	0.657 0241	
24	359	42	28.3	5 29.12	9.1	1 17	21.9	1.29	0.695 3696	0.659 8812	0.662 7508	
28	0	4	24.9	5 29.17	8.8	1 17	27.0	1.24	0.695 3407	0.665 6293	0.668 5129	
Dec. 2	0	26	21.7	5 29.21	8.5	1 17	31.8	1.19	0.695 3127	0.671 3982	0.674 2818	
6	0	48	18.6	5 29.25	8.1	1 17	36.5	1.14	0.695 2854	0.677 1602	0.680 0301	
10	1	10	15.7	5 29.29	+ 7.8	-1 17	41.0	-1.10	0.695 2589	0.682 8882	0.685 7311	
14	1	32	13.0	5 29.33	7.5	1 17	45.3	1.05	0.695 2332	0.688 5560	0.691 3604	
18	1	54	10.4	5 29.37	7.1	1 17	49.4	1.00	0.695 2083	0.694 1419	0.696 8981	
22	2	16	8.0	5 29.41	6.8	1 17	53.3	0.95	0.695 1842	0.699 6271	0.702 3269	
26	2	38	5.7	5 29.44	6.5	1 17	57.0	0.91	0.695 1609	0.704 9955	0.707 6310	
30	3	0	3.5	5 29.48	+ 6.2	-1 18	0.6	-0.86	0.695 1384	0.710 2317	0.712 7958	
34	3	22	1.5	5 29.51	+ 5.9	-1 18	3.9	-0.81	0.695 1166	0.715 3216		

SATURN.

GREENWICH MEAN NOON.

Date.	Heliocentric Longitude, Mean Equinox of Date.		Daily Motion.	Reduction to Orbit.	Heliocentric Latitude.		Daily Motion.	Logarithm of Radius Vec- tor.	Logarithm of Ea
	" "	" "	" "	" "	" "	" "	" "		At Date.
Jan.	0	89 12 37.0	2 14.74	-1 11.8	-1 0 13.2	+5.36	0.954 9047	0.905 6162	
	4	89 21 35.9	2 14.74	1 11.4	0 59 51.8	5.37	0.954 9027	0.906 4412	
	8	89 30 34.9	2 14.74	1 11.1	0 59 30.3	5.37	0.954 9009	0.907 5271	
	12	89 39 33.8	2 14.74	1 10.8	0 59 8.8	5.38	0.954 8993	0.908 8665	
	16	89 48 32.8	2 14.74	1 10.5	0 58 47.3	5.39	0.954 8978	0.910 4491	
	20	89 57 31.8	2 14.74	-1 10.1	-0 58 25.7	+5.39	0.954 8965	0.912 2622	
Feb.	24	90 6 30.7	2 14.74	1 9.8	0 58 4.1	5.40	0.954 8953	0.914 2902	
	28	90 15 29.7	2 14.74	1 9.4	0 57 42.5	5.40	0.954 8943	0.916 5164	
	1	90 24 28.7	2 14.74	1 9.0	0 57 20.9	5.41	0.954 8934	0.918 9241	
	5	90 33 27.6	2 14.74	1 8.7	0 56 59.2	5.42	0.954 8927	0.921 4962	
	9	90 42 26.6	2 14.74	-1 8.3	-0 56 37.6	+5.42	0.954 8922	0.924 2162	
	13	90 51 25.6	2 14.74	1 8.0	0 56 15.9	5.43	0.954 8918	0.927 0662	
Mar.	17	91 0 24.6	2 14.75	1 7.6	0 55 54.1	5.43	0.954 8916	0.930 0276	
	21	91 9 23.6	2 14.75	1 7.2	0 55 32.4	5.44	0.954 8915	0.933 0802	
	25	91 18 22.5	2 14.75	1 6.8	0 55 10.6	5.44	0.954 8916	0.936 2052	
	1	91 27 21.5	2 14.75	-1 6.5	-0 54 48.8	+5.45	0.954 8919	0.939 3841	
	5	91 36 20.5	2 14.75	1 6.1	0 54 27.0	5.46	0.954 8922	0.942 6017	
	9	91 45 19.5	2 14.75	1 5.7	0 54 5.2	5.46	0.954 8927	0.945 8412	
Apr.	13	91 54 18.5	2 14.75	1 5.4	0 53 43.3	5.47	0.954 8935	0.949 0872	
	17	92 3 17.5	2 14.75	1 5.0	0 53 21.4	5.47	0.954 8944	0.952 3236	
	21	92 12 16.4	2 14.74	-1 4.6	-0 52 59.5	+5.48	0.954 8954	0.955 5352	
	25	92 21 15.4	2 14.74	1 4.2	0 52 37.6	5.48	0.954 8966	0.958 7082	
	29	92 30 14.4	2 14.74	1 3.8	0 52 15.7	5.49	0.954 8979	0.961 8294	
	2	92 39 13.4	2 14.74	1 3.4	0 51 53.7	5.49	0.954 8994	0.964 8876	
May	6	92 48 12.4	2 14.74	1 3.0	0 51 31.7	5.50	0.954 9011	0.967 8728	
	10	92 57 11.3	2 14.74	-1 2.7	-0 51 9.7	+5.50	0.954 9029	0.970 7752	
	14	93 6 10.3	2 14.74	1 2.3	0 50 47.7	5.51	0.954 9049	0.973 5847	
	18	93 15 9.3	2 14.74	1 1.9	0 50 25.6	5.51	0.954 9070	0.976 2917	
	22	93 24 8.2	2 14.74	1 1.5	0 50 3.6	5.52	0.954 9093	0.978 8876	
	26	93 33 7.2	2 14.74	1 1.1	0 49 41.5	5.53	0.954 9117	0.981 3652	
June	30	93 42 6.1	2 14.74	-1 0.7	-0 49 19.4	+5.53	0.954 9143	0.983 7106	
	4	93 51 5.1	2 14.74	1 0.3	0 48 57.2	5.54	0.954 9171	0.985 9445	
	8	94 0 4.0	2 14.73	0 59.9	0 48 35.1	5.54	0.954 9200	0.988 0364	
	12	94 9 3.0	2 14.73	0 59.5	0 48 12.9	5.54	0.954 9231	0.989 9884	
	16	94 18 1.9	2 14.73	0 59.1	0 47 50.7	5.55	0.954 9263	0.991 7955	
	20	94 27 0.8	2 14.73	-0 58.7	-0 47 28.5	+5.55	0.954 9297	0.993 4547	
July	24	94 35 59.7	2 14.73	0 58.2	0 47 6.3	5.56	0.954 9332	0.994 9612	
	28	94 44 58.6	2 14.73	0 57.8	0 46 44.1	5.56	0.954 9369	0.996 3144	
	1	94 53 57.5	2 14.72	0 57.4	0 46 21.8	5.57	0.954 9408	0.997 5115	
	5	95 2 56.4	2 14.72	0 57.0	0 45 59.5	5.57	0.954 9448	0.998 5516	
	9	95 11 55.3	2 14.72	-0 56.6	-0 45 37.2	+5.58	0.954 9490	0.999 4312	
	13	95 20 54.2	2 14.72	0 56.2	0 45 14.9	5.58	0.954 9533	1.000 1482	
	17	95 29 53.1	2 14.72	0 55.8	0 44 52.5	5.59	0.954 9578	1.000 7009	
	21	95 38 51.9	2 14.71	0 55.4	0 44 30.2	5.59	0.954 9625	1.001 0892	
	25	95 47 50.8	2 14.71	0 54.9	0 44 7.8	5.60	0.954 9673	1.001 3131	
	29	95 56 49.6	2 14.71	-0 54.5	-0 43 45.4	+5.60	0.954 9723	1.001 3731	
	3	96 5 48.5	2 14.71	-0 54.1	-0 43 23.0	+5.61	0.954 9774	1.001 2691	

[Eph 13]

SATURN.

GREENWICH MEAN NOON.

Date.	Heliocentric Longitude, Mean Equinox of Date.			Daily Motion.	Reduction to Orbit.	Heliocentric Latitude.			Daily Motion.	Logarithm of Radius Vector.	Logarithm of Distance from Earth—	
	'	"	'''			'	"	'''			At Date.	At Intermediate Date.
July 3	96	5	48.5	2 14.71	— 54.1	— 43	23.0		+5.61	0.954 9774	1.001 2691	1.001 1555
7	96	14	47.3	2 14.70	0 53.7	0 43	0.6		5.61	0.954 9827	1.001 0007	1.000 8047
11	96	23	46.1	2 14.70	0 53.2	0 42	38.1		5.61	0.954 9881	1.000 5675	1.000 2891
15	96	32	44.9	2 14.70	0 52.8	0 42	15.7		5.62	0.954 9937	0.999 9699	0.999 6099
19	96	41	43.7	2 14.70	0 52.4	0 41	53.2		5.62	0.954 9995	0.999 2095	0.998 7689
23	96	50	42.5	2 14.69	— 52.0	— 41	30.7		+5.63	0.955 0054	0.998 2885	0.997 7685
27	96	59	41.2	2 14.69	0 51.5	0 41	8.2		5.63	0.955 0115	0.997 2093	0.996 6110
31	97	8	40.0	2 14.69	0 51.1	0 40	45.7		5.63	0.955 0177	0.995 9738	0.995 2978
Aug. 4	97	17	38.7	2 14.68	0 50.6	0 40	23.1		5.64	0.955 0241	0.994 5833	0.993 8306
8	97	26	37.4	2 14.68	0 50.2	0 40	0.6		5.64	0.955 0306	0.993 0401	0.992 2121
12	97	35	36.1	2 14.68	— 49.8	— 39	38.0		+5.65	0.955 0373	0.991 3468	0.990 4450
16	97	44	34.8	2 14.67	0 49.3	0 39	15.4		5.65	0.955 0442	0.989 5072	0.988 5343
20	97	53	33.5	2 14.67	0 48.9	0 38	52.8		5.65	0.955 0512	0.987 5267	0.986 4850
24	98	2	32.2	2 14.66	0 48.4	0 38	30.2		5.66	0.955 0584	0.985 4099	0.984 3020
28	98	11	30.8	2 14.66	0 48.0	0 38	7.5		5.66	0.955 0657	0.983 1618	0.981 9898
Sept. 1	98	20	29.5	2 14.66	— 47.6	— 37	44.9		+5.66	0.955 0732	0.980 7867	0.979 5532
5	98	29	28.1	2 14.65	0 47.1	0 37	22.2		5.67	0.955 0808	0.978 2901	0.976 9983
9	98	38	26.7	2 14.65	0 46.7	0 36	59.5		5.67	0.955 0886	0.975 6786	0.974 3321
13	98	47	25.3	2 14.64	0 46.2	0 36	36.8		5.68	0.955 0965	0.972 9599	0.971 5632
17	98	56	23.9	2 14.64	0 45.8	0 36	14.1		5.68	0.955 1046	0.970 1431	0.968 7008
21	99	5	22.4	2 14.64	— 45.3	— 35	51.4		+5.68	0.955 1129	0.967 2375	0.965 7543
25	99	14	21.0	2 14.63	0 44.9	0 35	28.7		5.69	0.955 1213	0.964 2525	0.962 7331
29	99	23	19.5	2 14.63	0 44.4	0 35	5.9		5.69	0.955 1298	0.961 1974	0.959 6466
Oct. 3	99	32	18.0	2 14.62	0 44.0	0 34	43.2		5.69	0.955 1385	0.958 0822	0.956 5059
7	99	41	16.5	2 14.62	0 43.5	0 34	20.4		5.70	0.955 1474	0.954 9193	0.953 3241
11	99	50	14.9	2 14.61	— 43.0	— 33	57.6		+5.70	0.955 1564	0.951 7219	0.950 1148
15	99	59	13.4	2 14.61	0 42.6	0 33	34.8		5.70	0.955 1656	0.948 5047	0.946 8936
19	100	8	11.8	2 14.60	0 42.1	0 33	12.0		5.71	0.955 1749	0.945 2831	0.943 6750
23	100	17	10.2	2 14.60	0 41.7	0 32	49.2		5.71	0.955 1844	0.942 0712	0.940 4738
27	100	26	8.6	2 14.59	0 41.2	0 32	26.3		5.71	0.955 1941	0.938 8846	0.937 3056
31	100	35	6.9	2 14.59	— 40.8	— 32	3.5		+5.71	0.955 2039	0.935 7390	0.934 1870
Nov. 4	100	44	5.2	2 14.58	0 40.3	0 31	40.6		5.72	0.955 2138	0.932 6518	0.931 1359
8	100	53	3.5	2 14.58	0 39.8	0 31	17.7		5.72	0.955 2239	0.929 6417	0.928 1715
12	101	2	1.8	2 14.57	0 39.4	0 30	54.8		5.72	0.955 2342	0.926 7277	0.925 3127
16	101	11	0.1	2 14.56	0 38.9	0 30	31.9		5.73	0.955 2446	0.923 9287	0.922 5780
20	101	19	58.3	2 14.56	— 38.4	— 30	9.0		+5.73	0.955 2552	0.921 2626	0.919 9847
24	101	28	56.6	2 14.55	0 38.0	0 29	46.1		5.73	0.955 2659	0.918 7465	0.917 5500
28	101	37	54.8	2 14.55	0 37.5	0 29	23.2		5.74	0.955 2768	0.916 3975	0.915 2912
Dec. 2	101	46	52.9	2 14.54	0 37.0	0 29	0.2		5.74	0.955 2878	0.914 2332	0.913 2256
6	101	55	51.1	2 14.53	0 36.6	0 28	37.3		5.74	0.955 2990	0.912 2706	0.911 3703
10	102	4	49.2	2 14.53	— 36.1	— 28	14.3		+5.74	0.955 3104	0.910 5266	0.909 7411
14	102	13	47.3	2 14.52	0 35.6	0 27	51.3		5.75	0.955 3219	0.909 0153	0.908 3505
18	102	22	45.4	2 14.51	0 35.1	0 27	28.3		5.75	0.955 3335	0.907 7480	0.907 2089
22	102	31	43.4	2 14.51	0 34.7	0 27	5.3		5.75	0.955 3453	0.906 7342	0.906 3250
26	102	40	41.4	2 14.50	0 34.2	0 26	42.3		5.75	0.955 3573	0.905 9822	0.905 7066
30	102	49	39.4	2 14.49	— 33.7	— 26	19.3		+5.76	0.955 3694	0.905 4988	0.905 3596
34	102	58	37.4	2 14.49	— 33.2	— 25	56.3		+5.76	0.955 3817	0.905 2894	0.905 2884

[Eph 15]

URANUS.

GREENWICH MEAN NOON.

Date.	Heliocentric Longitude, Mean Equinox of Date.	Daily Motion.	Reduction to Orbit.	Heliocentric Latitude.	Daily Motion.	Logarithm of Radius Vec- tor.	Logarithm o Ea
							At Date.
	" ' "	"	"	" ' "	"		
Jan. 4	311 19 58.1	39.48	+8.4	-0 39 11.7	-0.28	1.298 6363	1.317 2525
12	311 25 14.7	39.47	8.5	0 39 14.0	0.28	1.298 6557	1.318 4110
20	311 30 30.5	39.47	8.5	0 39 16.2	0.28	1.298 6751	1.319 2068
28	311 35 46.2	39.47	8.5	0 39 18.5	0.28	1.298 6945	1.319 6291
Feb. 5	311 41 1.9	39.46	8.5	0 39 20.8	0.28	1.298 7139	1.319 6755
13	311 46 17.6	39.46	+8.4	-0 39 23.0	-0.28	1.298 7331	1.319 3464
21	311 51 33.3	39.46	8.4	0 39 25.2	0.28	1.298 7523	1.318 6458
Mar. 1	311 56 48.9	39.45	8.4	0 39 27.5	0.28	1.298 7715	1.317 5880
9	312 2 4.5	39.45	8.4	0 39 29.7	0.28	1.298 7907	1.316 1915
17	312 7 20.1	39.44	8.4	0 39 32.0	0.28	1.298 8097	1.314 4763
25	312 12 35.6	39.44	+8.3	-0 39 34.2	-0.28	1.298 8287	1.312 4699
Apr. 2	312 17 51.1	39.44	8.3	0 39 36.4	0.28	1.298 8477	1.310 2069
10	312 23 6.6	39.43	8.3	0 39 38.6	0.28	1.298 8667	1.307 7228
18	312 28 22.0	39.43	8.3	0 39 40.8	0.28	1.298 8857	1.305 0566
26	312 33 37.4	39.42	8.3	0 39 43.0	0.28	1.298 9045	1.302 2551
May 4	312 38 52.8	39.42	+8.3	-0 39 45.2	-0.28	1.298 9233	1.299 3667
12	312 44 8.2	39.42	8.3	0 39 47.4	0.27	1.298 9420	1.296 4398
20	312 49 23.5	39.42	8.2	0 39 49.6	0.27	1.298 9607	1.293 5279
28	312 54 38.8	39.41	8.2	0 39 51.8	0.27	1.298 9793	1.290 6873
June 5	312 59 54.0	39.41	8.2	0 39 54.0	0.27	1.298 9979	1.287 9709
13	313 5 9.3	39.41	+8.2	-0 39 56.1	-0.27	1.299 0164	1.285 4312
21	313 10 24.5	39.40	8.2	0 39 58.3	0.27	1.299 0349	1.283 1229
29	313 15 39.7	39.40	8.2	0 40 0.4	0.27	1.299 0533	1.281 0947
July 7	313 20 54.8	39.39	8.2	0 40 2.6	0.27	1.299 0717	1.279 3883
15	313 26 9.9	39.39	8.2	0 40 4.7	0.27	1.299 0899	1.278 0438
23	313 31 24.9	39.39	+8.2	-0 40 6.9	-0.27	1.299 1081	1.277 0940
31	313 36 40.0	39.38	8.1	0 40 9.0	0.27	1.299 1264	1.276 5598
Aug. 8	313 41 55.0	39.38	8.1	0 40 11.1	0.27	1.299 1446	1.276 4549
16	313 47 10.0	39.37	8.1	0 40 13.2	0.27	1.299 1627	1.276 7864
24	313 52 24.9	39.37	8.1	0 40 15.3	0.27	1.299 1807	1.277 5470
Sept. 1	313 57 39.9	39.36	+8.1	-0 40 17.4	-0.26	1.299 1987	1.278 7194
9	314 2 54.8	39.36	8.1	0 40 19.5	0.26	1.299 2167	1.280 2811
17	314 8 9.6	39.36	8.0	0 40 21.6	0.26	1.299 2346	1.282 1993
25	314 13 24.4	39.35	8.0	0 40 23.7	0.26	1.299 2525	1.284 4300
Oct. 3	314 18 39.2	39.35	8.0	0 40 25.8	0.26	1.299 2704	1.286 9265
11	314 23 54.0	39.34	+8.0	-0 40 27.9	-0.26	1.299 2882	1.289 6388
19	314 29 8.7	39.34	8.0	0 40 30.0	0.26	1.299 3059	1.292 5097
27	314 34 23.4	39.34	8.0	0 40 32.0	0.26	1.299 3236	1.295 4798
Nov. 4	314 39 38.1	39.33	8.0	0 40 34.1	0.26	1.299 3412	1.298 4933
12	314 44 52.8	39.33	7.9	0 40 36.2	0.25	1.299 3588	1.301 4933
20	314 50 7.4	39.33	+7.9	-0 40 38.2	-0.25	1.299 3763	1.304 4212
28	314 55 22.0	39.32	7.9	0 40 40.2	0.25	1.299 3938	1.307 2259
Dec. 6	315 0 36.5	39.32	7.9	0 40 42.3	0.25	1.299 4112	1.309 8604
14	315 5 51.0	39.31	7.9	0 40 44.3	0.25	1.299 4286	1.312 2777
22	315 11 5.5	39.31	7.9	0 40 46.3	0.25	1.299 4459	1.314 4376
30	315 16 20.0	39.30	+7.8	-0 40 48.3	-0.25	1.299 4631	1.316 3085
38	315 21 34.4	39.30	+7.8	-0 40 50.3	-0.25	1.299 4803	1.317 8610

NEPTUNE.

GREENWICH MEAN NOON.

Date.	Heliocentric Longitude, Mean Equinox of Date.	Daily Motion.	Reduction to Orbit.	Heliocentric Latitude.	Daily Motion.	Logarithm of Radius Vec- tor.	Logarithm of Distance from Earth—	
							At Date.	At Interme- diate Date.
	° ' "	"	"	° ' "	"			
m. 4	118 57 47.3	21.73	-20.0	0 21 58.3	+0.66	1.477 1163	1.463 2254	1.462 9684
12	119 0 41.1	21.73	19.9	0 21 53.0	0.66	1.477 1198	1.462 7844	1.462 6745
20	119 3 34.9	21.73	19.9	0 21 47.8	0.66	1.477 1234	1.462 6396	1.462 6798
28	119 6 28.7	21.73	19.8	0 21 42.5	0.66	1.477 1269	1.462 7942	1.462 9818
Feb. 5	119 9 22.5	21.73	19.7	0 21 37.3	0.66	1.477 1304	1.463 2417	1.463 5725
13	119 12 16.3	21.73	-19.6	0 21 32.0	+0.66	1.477 1340	1.463 9723	1.464 4386
21	119 15 10.1	21.73	19.6	0 21 26.7	0.66	1.477 1375	1.464 9685	1.465 5585
Mar. 1	119 18 3.9	21.73	19.5	0 21 21.5	0.66	1.477 1411	1.466 2050	1.466 9042
9	119 20 57.7	21.73	19.4	0 21 16.2	0.66	1.477 1447	1.467 6525	1.468 4459
17	119 23 51.6	21.73	19.3	0 21 10.9	0.66	1.477 1482	1.469 2799	1.470 1499
25	119 26 45.4	21.73	-19.2	0 21 5.6	+0.66	1.477 1518	1.471 0509	1.471 9780
Apr. 2	119 29 39.2	21.73	19.2	0 21 0.4	0.66	1.477 1554	1.472 9267	1.473 8924
10	119 32 33.0	21.73	19.1	0 20 55.1	0.66	1.477 1590	1.474 8705	1.475 8562
18	119 35 26.8	21.73	19.0	0 20 49.8	0.66	1.477 1626	1.476 8447	1.477 8311
26	119 38 20.6	21.73	19.0	0 20 44.6	0.66	1.477 1662	1.478 8107	1.479 7793
May 4	119 41 14.4	21.73	-18.9	0 20 39.3	+0.66	1.477 1698	1.480 7330	1.481 6679
12	119 44 8.2	21.73	18.8	0 20 34.0	0.66	1.477 1734	1.482 5800	1.483 4653
20	119 47 2.0	21.73	18.7	0 20 28.7	0.66	1.477 1771	1.484 3199	1.485 1403
28	119 49 55.8	21.73	18.6	0 20 23.4	0.66	1.477 1807	1.485 9234	1.486 6667
June 5	119 52 49.6	21.73	18.6	0 20 18.2	0.66	1.477 1844	1.487 3673	1.488 0225
13	119 55 43.5	21.73	-18.5	0 20 12.9	+0.66	1.477 1880	1.488 6297	1.489 1863
21	119 58 37.3	21.73	18.4	0 20 7.6	0.66	1.477 1917	1.489 6903	1.490 1401
29	120 1 31.1	21.73	18.3	0 20 2.3	0.66	1.477 1953	1.490 5344	1.490 8719
July 7	120 4 24.9	21.73	18.2	0 19 57.0	0.66	1.477 1990	1.491 1512	1.491 3710
15	120 7 18.7	21.73	18.2	0 19 51.8	0.66	1.477 2027	1.491 5303	1.491 6286
23	120 10 12.5	21.73	-18.1	0 19 46.5	+0.66	1.477 2064	1.491 6656	1.491 6415
31	120 13 6.4	21.73	18.0	0 19 41.2	0.66	1.477 2101	1.491 5564	1.491 4103
Aug. 8	120 16 0.2	21.73	17.9	0 19 35.9	0.66	1.477 2138	1.491 2035	1.490 9363
16	120 18 54.0	21.73	17.9	0 19 30.6	0.66	1.477 2175	1.490 6097	1.490 2251
24	120 21 47.8	21.73	17.8	0 19 25.3	0.66	1.477 2212	1.489 7840	1.489 2880
Sept. 1	120 24 41.6	21.73	-17.7	0 19 20.0	+0.66	1.477 2249	1.488 7385	1.488 1374
9	120 27 35.5	21.73	17.6	0 19 14.8	0.66	1.477 2286	1.487 4867	1.486 7889
17	120 30 29.3	21.73	17.6	0 19 9.5	0.66	1.477 2324	1.486 0468	1.485 2636
25	120 33 23.1	21.73	17.5	0 19 4.2	0.66	1.477 2361	1.484 4423	1.483 5860
Oct. 3	120 36 16.9	21.73	17.4	0 18 58.9	0.66	1.477 2398	1.482 6980	1.481 7818
11	120 39 10.8	21.73	-17.3	0 18 53.6	+0.66	1.477 2436	1.480 8415	1.479 8815
19	120 42 4.6	21.73	17.2	0 18 48.3	0.66	1.477 2473	1.478 9063	1.477 9202
27	120 44 58.4	21.73	17.2	0 18 43.0	0.66	1.477 2510	1.476 9276	1.475 9328
Nov. 4	120 47 52.3	21.73	17.1	0 18 37.7	0.66	1.477 2548	1.474 9405	1.473 9559
12	120 50 46.1	21.73	17.0	0 18 32.4	0.66	1.477 2585	1.472 9843	1.472 0308
20	120 53 39.9	21.73	-16.9	0 18 27.1	+0.66	1.477 2623	1.471 1002	1.470 1971
28	120 56 33.8	21.73	16.8	0 18 21.8	0.66	1.477 2660	1.469 3263	1.468 4924
Dec. 6	120 59 27.6	21.73	16.8	0 18 16.5	0.66	1.477 2698	1.467 7003	1.466 9547
14	121 2 21.4	21.73	16.7	0 18 11.2	0.66	1.477 2735	1.466 2601	1.465 6203
22	121 5 15.3	21.73	16.6	0 18 5.9	0.66	1.477 2773	1.465 0387	1.464 5185
30	121 8 9.1	21.73	-16.5	0 18 0.6	+0.66	1.477 2811	1.464 0627	1.463 6743
38	121 11 3.0	21.73	-16.5	0 17 55.3	+0.66	1.477 2848	1.463 3559	1.463 1097

FOR GREENWICH MEAN NOON AND MIDNIGHT.

Date.	X		Reduc. to Mean Eq'x of Jan. o.	Y		Reduc. to Mean Eq'x of Jan. o.	Z	
	True Equinox.			True Equinox.			True Equinox.	
	Noon.	Midnight.		Noon.	Midnight.		Noon.	Midnight.
Jan. 1	+0.170 8904	+0.179 4931	-429	-0.888 2779	-0.886 8457	-206	-0.385 3545	-0.384 7334
2	0.188 0821	0.196 6565	436	0.885 3447	0.883 7753	214	0.384 0826	0.383 4020
3	0.205 2158	0.213 7593	443	0.882 1374	0.880 4312	223	0.382 6918	0.381 9519
4	0.222 2865	0.230 7967	450	0.878 6567	0.876 8140	232	0.381 1824	0.380 3833
5	0.239 2892	0.247 7635	457	0.874 9032	0.872 9245	241	0.379 5547	0.378 6967
6	+0.256 2189	+0.264 6548	-464	-0.870 8780	-0.868 7639	-250	-0.377 8092	-0.376 8924
7	0.273 0706	0.281 4655	471	0.866 5822	0.864 3331	259	0.375 9463	0.374 9709
8	0.289 8389	0.298 1902	477	0.862 0167	0.859 6331	268	0.373 9662	0.372 9324
9	0.306 5187	0.314 8238	483	0.857 1825	0.854 6651	278	0.371 8695	0.370 7775
10	0.323 1047	0.331 3608	489	0.852 0810	0.849 4303	288	0.369 6566	0.368 5068
11	+0.339 5914	+0.347 7958	-495	-0.846 7133	-0.843 9301	-298	-0.367 3281	-0.366 1207
12	0.355 9734	0.364 1235	500	0.841 0809	0.838 1659	308	0.364 8846	0.363 6199
13	0.372 2454	0.380 3384	505	0.835 1853	0.832 1394	318	0.362 3268	0.361 0052
14	0.388 4019	0.396 4351	509	0.829 0285	0.825 8527	329	0.359 6554	0.358 2774
15	0.404 4373	0.412 4079	513	0.822 6123	0.819 3076	340	0.356 8713	0.355 4373
16	+0.420 3463	+0.428 2518	-517	-0.815 9388	-0.812 5064	-351	-0.353 9755	-0.352 4861
17	0.436 1437	0.443 9614	520	0.809 0105	0.805 4515	362	0.350 9692	0.349 4249
18	0.451 7642	0.459 5315	523	0.801 8297	0.798 1455	373	0.347 8534	0.346 2548
19	0.467 2627	0.474 9573	526	0.794 3991	0.790 5910	384	0.344 6292	0.342 9769
20	0.482 6146	0.490 2343	528	0.786 7215	0.782 7909	395	0.341 2979	0.339 5924
21	+0.497 8151	+0.505 3572	-530	-0.778 7995	-0.774 7477	-406	-0.337 8606	-0.336 1027
22	0.512 8597	0.520 3220	532	0.770 6358	0.766 4643	418	0.334 3187	0.332 5088
23	0.527 7435	0.535 1238	533	0.762 2334	0.757 9436	430	0.330 6732	0.328 8120
24	0.542 4622	0.549 7585	534	0.753 5952	0.749 1886	442	0.326 9255	0.325 0138
25	0.557 0119	0.564 2219	534	0.744 7242	0.740 2023	454	0.323 0771	0.321 1154
26	+0.571 3880	+0.578 5097	-534	-0.735 6233	-0.730 9876	-466	-0.319 1290	-0.317 1180
27	0.585 5864	0.592 6178	534	0.726 2956	0.721 5477	478	0.315 0827	0.313 0231
28	0.599 6032	0.606 5422	533	0.716 7442	0.711 8856	490	0.310 9395	0.308 8320
29	0.613 4343	0.620 2791	532	0.706 9722	0.702 0044	502	0.306 7007	0.304 5459
30	0.627 0761	0.633 8247	530	0.696 9826	0.691 9071	514	0.302 3676	0.300 1661
31	+0.640 5245	+0.647 1750	-528	-0.686 7784	-0.681 5969	-526	-0.297 9416	-0.295 6941
Feb. 1	0.653 7757	0.660 3264	526	0.676 3629	0.671 0768	538	0.293 4238	0.291 1309
2	0.666 8264	0.673 2753	523	0.665 7390	0.660 3498	550	0.288 8155	0.286 4779
3	0.679 6725	0.686 0177	520	0.654 9097	0.649 4190	561	0.284 1182	0.281 7365
4	0.692 3103	0.698 5498	516	0.643 8782	0.638 2876	572	0.279 3331	0.276 9080
5	+0.704 7358	+0.710 8679	-512	-0.632 6477	-0.626 9587	-584	-0.274 4615	-0.271 9938
6	0.716 9455	0.722 9683	508	0.621 2211	0.615 4355	596	0.269 5049	0.266 9950
7	0.728 9354	0.734 8467	503	0.609 6021	0.603 7214	607	0.264 4644	0.261 9132
8	0.740 7015	0.746 4995	498	0.597 7939	0.591 8200	618	0.259 3416	0.256 7499
9	0.752 2401	0.757 9229	493	0.585 8001	0.579 7348	629	0.254 1383	0.251 5068
10	+0.763 5473	+0.769 1129	-487	-0.573 6244	-0.567 4695	-640	-0.248 8558	-0.246 1854
11	0.774 6192	0.780 0659	481	0.561 2705	0.555 0280	651	0.243 4959	0.240 7875
12	0.785 4524	0.790 7783	474	0.548 7425	0.542 4145	662	0.238 0604	0.235 3148
13	0.796 0432	0.801 2466	467	0.536 0444	0.529 6329	673	0.232 5509	0.229 7691
14	0.806 3831	0.811 4673	460	0.523 1804	0.516 6876	683	0.226 9695	0.224 1524
15	+0.816 4839	+0.821 4374	-452	-0.510 1549	-0.503 5830	-693	-0.221 3180	-0.218 4666
16	+0.826 3275	+0.831 1539	-444	-0.496 9724	-0.490 3236	-703	-0.215 5984	-0.212 7137

FOR GREENWICH MEAN NOON AND MIDNIGHT.

Date.	X		Reduc. to Mean Eq'x of Jan. o.	Y		Reduc. to Mean Eq'x of Jan. o.	Z		Reduc. to Mean Eq'x of Jan. o.
	True Equinox.			True Equinox.			True Equinox.		
	Noon.	Midnight.		Noon.	Midnight.		Noon.	Midnight.	
Feb. 16	+0.826 3275	+0.831 1539	-444	-0.496 9724	-0.490 3236	-703	-0.215 5984	-0.212 7137	-80
17	0.835 9161	0.840 6138	435	0.483 6373	0.476 9139	713	0.209 8127	0.206 8957	90
18	0.845 2468	0.849 8147	426	0.470 1541	0.463 3583	723	0.203 9629	0.201 0144	100
19	0.854 3172	0.858 7540	417	0.456 5271	0.449 6612	733	0.198 0507	0.195 0719	110
20	0.863 1247	0.867 4291	408	0.442 7611	0.435 8273	742	0.192 0784	0.189 0703	120
21	+0.871 6669	+0.875 8379	-398	-0.428 8605	-0.421 8611	-751	-0.186 0479	-0.183 0114	-130
22	0.879 9418	0.883 9783	388	0.414 8298	0.407 7671	760	0.179 9611	0.176 8972	141
23	0.887 9472	0.891 8482	377	0.400 6735	0.393 5497	769	0.173 8200	0.170 7297	151
24	0.895 6811	0.899 4456	366	0.386 3962	0.379 2135	778	0.167 6265	0.164 5107	161
25	0.903 1416	0.906 7688	355	0.372 0023	0.364 7630	787	0.161 3825	0.158 2422	171
26	+0.910 3270	+0.913 8160	-344	-0.357 4963	-0.350 2027	-795	-0.155 0900	-0.151 9261	-181
27	0.917 2357	0.920 5858	332	0.342 8827	0.335 5369	803	0.148 7509	0.145 5646	191
28	0.923 8662	0.927 0765	320	0.328 1658	0.320 7700	811	0.142 3670	0.139 1589	201
Mar. 1	0.930 2167	0.933 2865	307	0.313 3500	0.305 9064	819	0.135 9402	0.132 7113	211
2	0.936 2859	0.939 2146	294	0.298 4396	0.290 9503	826	0.129 4723	0.126 2235	221
3	+0.942 0725	+0.944 8593	-281	-0.283 4388	-0.275 9058	-833	-0.122 9651	-0.119 6974	-231
4	0.947 5748	0.950 2188	268	0.268 3517	0.260 7772	840	0.116 4205	0.113 1347	241
5	0.952 7912	0.955 2918	254	0.253 1828	0.245 5689	847	0.109 8402	0.106 5372	251
6	0.957 7203	0.960 0765	240	0.237 9362	0.230 2852	854	0.103 2260	0.099 9068	261
7	0.962 3603	0.964 5714	226	0.222 6164	0.214 9305	860	0.096 5799	0.093 2455	271
8	+0.966 7098	+0.968 7752	-212	-0.207 2279	-0.199 5093	-866	-0.089 9038	-0.086 5551	-281
9	0.970 7675	0.972 6864	197	0.191 7752	0.184 0262	872	0.083 1997	0.079 8378	291
10	0.974 5318	0.976 3035	182	0.176 2630	0.168 4861	878	0.076 4696	0.073 0954	300
11	0.978 0013	0.979 6251	167	0.160 6961	0.152 8938	883	0.069 7156	0.066 3303	309
12	0.981 1749	0.982 6505	152	0.145 0794	0.137 2539	888	0.062 9399	0.059 5446	319
13	+0.984 0517	+0.985 3785	-137	-0.129 4179	-0.121 5719	-893	-0.056 1448	-0.052 7406	-328
14	0.986 6309	0.987 8086	121	0.113 7165	0.105 8524	897	0.049 3324	0.045 9204	337
15	0.988 9117	0.989 9399	105	0.097 9802	0.090 1006	901	0.042 5049	0.039 0862	346
16	0.990 8934	0.991 7721	89	0.082 2142	0.074 3217	905	0.035 6646	0.032 2403	355
17	0.992 5759	0.993 3049	72	0.066 4236	0.058 5206	909	0.028 8136	0.025 3849	364
18	+0.993 9590	+0.994 5383	-55	-0.050 6133	-0.042 7024	-912	-0.021 9543	-0.018 5221	-373
19	0.995 0427	0.995 4722	38	0.034 7885	0.026 8722	915	0.015 0887	0.011 6543	382
20	0.995 8269	0.996 1068	21	0.018 9541	-0.011 0348	918	0.008 2192	-0.004 7836	390
21	0.996 3119	0.996 4423	-3	-0.003 1150	+0.004 8048	921	-0.001 3478	+0.002 0880	398
22	0.996 4981	0.996 4793	+14	+0.012 7239	0.020 6417	923	+0.005 5234	0.008 9582	406
23	+0.996 3860	+0.996 2183	+32	+0.028 5577	+0.036 4712	-925	+0.012 3922	+0.015 8251	-414
24	0.995 9762	0.995 6599	50	0.044 3816	0.052 2884	926	0.019 2567	0.022 6866	422
25	0.995 2694	0.994 8049	68	0.060 1910	0.068 0887	927	0.026 1147	0.029 5406	430
26	0.994 2664	0.993 6541	86	0.075 9810	0.083 8674	928	0.032 9642	0.036 3852	438
27	0.992 9680	0.992 2083	104	0.091 7472	0.099 6199	929	0.039 8034	0.043 2185	446
28	+0.991 3752	+0.990 4687	+122	+0.107 4850	+0.115 3420	-929	+0.046 6302	+0.050 0384	-454
29	0.989 4889	0.988 4361	140	0.123 1902	0.131 0291	929	0.053 4429	0.056 8433	461
30	0.987 3103	0.986 1117	159	0.138 8583	0.146 6771	929	0.060 2395	0.063 6313	468
31	0.984 8404	0.983 4965	178	0.154 4851	0.162 2817	929	0.067 0184	0.070 4006	475
Apr. 1	0.982 0801	0.980 5913	197	0.170 0664	0.177 8387	929	0.073 7776	0.077 1492	482
2	+0.979 0302	+0.977 3970	+216	+0.185 5980	+0.193 3439	-928	+0.080 5153	+0.083 8756	-489
3	+0.975 6917	+0.973 9145	+235	+0.201 0758	+0.208 7931	-927	+0.087 2299	+0.090 5179	-496

FOR GREENWICH MEAN NOON AND MIDNIGHT.

Date.	X		Reduc. to Mean Eq'x of Jan. o.	Y		Reduc. to Mean Eq'x of Jan. o.	Z		
	True Equinox.			True Equinox.			True Equinox.		
	Noon.	Midnight.		Noon.	Midnight.		Noon.	Midnight.	
Apr.	1	+0.982 0801	+0.980 5913	+ 197	+0.170 0664	+0.177 8387	-929	+0.073 7776	+0.077
	2	0.979 0302	0.977 3970	216	0.185 5980	0.193 3439	928	0.080 5153	0.083
	3	0.975 6917	0.973 9145	235	0.201 0758	0.208 7931	927	0.087 2299	0.090
	4	0.972 0654	0.970 1446	254	0.216 4954	0.224 1821	926	0.093 9195	0.097
	5	0.968 1522	0.966 0884	274	0.231 8526	0.239 5064	925	0.100 5821	0.103
	6	+0.963 9533	+0.961 7469	+ 293	+0.247 1429	+0.254 7615	-923	+0.107 2158	+0.110
	7	0.959 4695	0.957 1212	313	0.262 3617	0.269 9428	921	0.113 8186	0.117
	8	0.954 7021	0.952 2125	333	0.277 5044	0.285 0459	919	0.120 3886	0.123
	9	0.949 6524	0.947 0221	353	0.292 5667	0.300 0662	917	0.126 9236	0.130
	10	0.944 3218	0.941 5517	373	0.307 5438	0.314 9990	914	0.133 4217	0.136
	11	+0.938 7121	+0.935 8031	+ 393	+0.322 4311	+0.329 8396	-911	+0.139 8809	+0.143
	12	0.932 8251	0.929 7782	413	0.337 2240	0.344 5837	908	0.146 2991	0.149
	13	0.926 6627	0.923 4788	433	0.351 9180	0.359 2264	904	0.152 6742	0.155
	14	0.920 2269	0.916 9072	453	0.366 5084	0.373 7634	900	0.159 0043	0.162
	15	0.913 5200	0.910 0655	474	0.380 9909	0.388 1903	895	0.165 2874	0.168
	16	+0.906 5443	+0.902 9565	+ 494	+0.395 3611	+0.402 5027	-890	+0.171 5216	+0.174
	17	0.899 3024	0.895 5824	514	0.409 6146	0.416 6964	885	0.177 7051	0.180
	18	0.891 7969	0.887 9461	535	0.423 7474	0.430 7671	880	0.183 8361	0.186
	19	0.884 0304	0.880 0501	556	0.437 7551	0.444 7108	875	0.189 9127	0.192
	20	0.876 0057	0.871 8974	577	0.451 6337	0.458 5233	869	0.195 9332	0.198
	21	+0.867 7257	+0.863 4908	+ 597	+0.465 3792	+0.472 2009	-863	+0.201 8958	+0.204
	22	0.859 1932	0.854 8331	618	0.478 9879	0.485 7397	857	0.207 7990	0.210
	23	0.850 4111	0.845 9274	639	0.492 4559	0.499 1360	851	0.213 6410	0.216
	24	0.841 3827	0.836 7771	660	0.505 7795	0.512 3860	844	0.219 4203	0.222
	25	0.832 1112	0.827 3853	681	0.518 9551	0.525 4864	837	0.225 1355	0.227
	26	+0.822 5997	+0.817 7548	+ 702	+0.531 9794	+0.538 4338	-830	+0.230 7850	+0.233
	27	0.812 8510	0.807 8887	723	0.544 8491	0.551 2250	822	0.236 3676	0.239
	28	0.802 8683	0.797 7902	744	0.557 5610	0.563 8568	814	0.241 8818	0.244
	29	0.792 6547	0.787 4622	765	0.570 1119	0.576 3260	806	0.247 3264	0.250
	30	0.782 2130	0.776 9075	786	0.582 4986	0.588 6294	797	0.252 6999	0.255
May	1	+0.771 5460	+0.766 1289	+ 807	+0.594 7180	+0.600 7640	-788	+0.258 0010	+0.260
	2	0.760 6565	0.755 1293	828	0.606 7669	0.612 7265	779	0.263 2283	0.265
	3	0.749 5476	0.743 9118	849	0.618 6422	0.624 5137	769	0.268 3803	0.270
	4	0.738 2222	0.732 4793	870	0.630 3405	0.636 1222	759	0.273 4557	0.275
	5	0.726 6833	0.720 8347	890	0.641 8584	0.647 5486	749	0.278 4530	0.280
	6	+0.714 9338	+0.708 9811	+ 911	+0.653 1924	+0.658 7895	-739	+0.283 3706	+0.285
	7	0.702 9770	0.696 9220	932	0.664 3394	0.669 8417	728	0.288 2069	0.290
	8	0.690 8165	0.684 6609	953	0.675 2959	0.680 7016	717	0.292 9605	0.295
	9	0.678 4558	0.672 2015	974	0.686 0584	0.691 3660	706	0.297 6301	0.299
	10	0.665 8985	0.659 5473	994	0.696 6239	0.701 8318	694	0.302 2142	0.304
	11	+0.653 1484	+0.646 7023	+1015	+0.706 9892	+0.712 0957	-682	+0.306 7112	+0.308
	12	0.640 2094	0.633 6703	1036	0.717 1510	0.722 1546	670	0.311 1199	0.313
	13	0.627 0855	0.620 4555	1056	0.727 1063	0.732 0056	657	0.315 4388	0.317
	14	0.613 7808	0.607 0619	1076	0.736 8523	0.741 6460	644	0.319 6668	0.321
	15	0.600 2994	0.593 4938	1096	0.746 3863	0.751 0729	631	0.323 8027	0.325
	16	+0.586 6456	+0.579 7554	+1116	+0.755 7054	+0.760 2835	-617	+0.327 8451	+0.329
	17	+0.572 8238	+0.565 8512	+1136	+0.764 8070	+0.769 2755	-603	+0.331 7931	+0.333

FOR GREENWICH MEAN NOON AND MIDNIGHT.

Date.	X True Equinox.		Reduc. to Mean Eq'x of Jan. o.	Y True Equinox.		Reduc. to Mean Eq'x of Jan. o.	Z True Equinox.		Reduc. to Mean Eq'x of Jan. o.
	Noon.	Midnight.		Noon.	Midnight.		Noon.	Midnight.	
May 17	+0.572 8238	+0.565 8512	+1136	+0.764 8070	+0.769 2755	-603	+0.331 7931	+0.333 7314	-572
18	0.558 8382	0.551 7853	1156	0.773 6886	0.778 0460	589	0.335 6456	0.337 5356	568
19	0.544 6931	0.537 5622	1176	0.782 3476	0.786 5930	574	0.339 4014	0.341 2427	564
20	0.530 3931	0.523 1864	1195	0.790 7820	0.794 9143	559	0.343 0596	0.344 8519	560
21	0.515 9427	0.508 6626	1215	0.798 9896	0.803 0077	544	0.346 6194	0.348 3621	556
22	+0.501 3465	+0.493 9951	+1234	+0.806 9683	+0.810 8712	-528	+0.350 0799	+0.351 7727	-551
23	0.486 6088	0.479 1883	1253	0.814 7162	0.818 5031	512	0.353 4404	0.355 0829	546
24	0.471 7341	0.464 2467	1272	0.822 2316	0.825 9015	495	0.356 7001	0.358 2919	541
25	0.456 7267	0.449 1746	1291	0.829 5127	0.833 0650	478	0.359 8582	0.361 3990	536
26	0.441 5910	0.433 9764	1310	0.836 5581	0.839 9919	461	0.362 9143	0.364 4039	530
27	+0.426 3313	+0.418 6562	+1328	+0.843 3663	+0.846 6810	-443	+0.365 8677	+0.367 3056	-524
28	0.410 9516	0.403 2181	1346	0.849 9358	0.853 1306	425	0.368 7176	0.370 1036	518
29	0.395 4561	0.387 6662	1364	0.856 2652	0.859 3394	407	0.371 4635	0.372 7973	512
30	0.379 8488	0.372 0044	1382	0.862 3530	0.865 3057	388	0.374 1048	0.375 3859	506
31	0.364 1335	0.356 2366	1399	0.868 1974	0.871 0279	369	0.376 6406	0.377 8688	499
June 1	+0.348 3142	+0.340 3670	+1416	+0.873 7970	+0.876 5045	-350	+0.379 0704	+0.380 2452	-492
2	0.332 3954	0.324 4000	1433	0.879 1502	0.881 7338	331	0.381 3932	0.382 5143	485
3	0.316 3812	0.308 3396	1450	0.884 2552	0.886 7141	311	0.383 6084	0.384 6754	478
4	0.300 2758	0.292 1903	1467	0.889 1103	0.891 4436	291	0.385 7152	0.386 7277	470
5	0.284 0838	0.275 9568	1483	0.893 7139	0.895 9210	271	0.387 7129	0.388 6707	462
6	+0.267 8098	+0.259 6435	+1499	+0.898 0648	+0.900 1449	-250	+0.389 6009	+0.390 5035	-454
7	0.251 4585	0.243 2553	1515	0.902 1613	0.904 1137	229	0.391 3784	0.392 2256	446
8	0.235 0346	0.226 7969	1530	0.906 0021	0.907 8263	207	0.393 0449	0.393 8363	437
9	0.218 5428	0.210 2730	1545	0.909 5861	0.911 2814	185	0.394 5998	0.395 3353	428
10	0.201 9881	0.193 6888	1559	0.912 9121	0.914 4780	163	0.396 0427	0.396 7220	419
11	+0.185 3756	+0.177 0491	+1573	+0.915 9789	+0.917 4148	-141	+0.397 3730	+0.397 9957	-410
12	0.168 7100	0.160 3589	1587	0.918 7856	0.920 0912	118	0.398 5902	0.399 1564	400
13	0.151 9964	0.143 6232	1601	0.921 3316	0.922 5065	95	0.399 6943	0.400 2038	390
14	0.135 2399	0.126 8471	1614	0.923 6162	0.924 6601	71	0.400 6848	0.401 1373	380
15	0.118 4455	0.110 0356	1627	0.925 6384	0.926 5511	47	0.401 5614	0.401 9570	370
16	+0.101 6182	+0.093 1938	+1639	+0.927 3982	+0.928 1796	-23	+0.402 3241	+0.402 6627	-360
17	0.084 7631	0.076 3267	1651	0.928 8953	0.929 5452	+1	0.402 9728	0.403 2544	349
18	0.067 8853	0.059 4395	1663	0.930 1294	0.930 6477	25	0.403 5074	0.403 7319	338
19	0.050 9809	0.042 5371	1674	0.931 1003	0.931 4871	50	0.403 9279	0.404 0954	327
20	0.034 0816	0.025 6241	1685	0.931 8082	0.932 0636	75	0.404 2344	0.404 3449	316
21	+0.017 1653	+0.008 7057	+1695	+0.932 2533	+0.932 3774	+101	+0.404 4269	+0.404 4804	-305
22	+0.000 2460	-0.008 2134	1705	0.932 4358	0.932 4287	127	0.404 5056	0.404 5024	294
23	-0.016 6718	0.025 1286	1714	0.932 3561	0.932 2181	153	0.404 4709	0.404 4110	282
24	0.033 5837	0.042 0358	1722	0.932 0147	0.931 7460	179	0.404 3228	0.404 2063	270
25	0.050 4848	0.058 9300	1730	0.931 4120	0.931 0128	206	0.404 0615	0.403 8885	258
26	-0.067 3710	-0.075 8072	+1738	+0.930 5484	+0.930 0190	+233	+0.403 6872	+0.403 4578	-246
27	0.084 2381	0.092 6632	1745	0.929 4245	0.928 7649	260	0.403 2001	0.402 9142	234
28	0.101 0819	0.109 4936	1752	0.928 0403	0.927 2507	287	0.402 6002	0.402 2580	222
29	0.117 8978	0.126 2940	1758	0.926 3962	0.925 4768	314	0.401 8877	0.401 4892	209
30	0.134 6816	0.143 0600	1764	0.924 4925	0.923 4434	342	0.401 0625	0.400 6077	197
y 1	-0.151 4288	-0.159 7873	+1769	+0.922 3895	+0.921 1508	+370	+0.400 1248	+0.399 6138	-184
21	-0.168 1350	-0.176 4712	+1773	+0.919 9075	+0.918 5994	+398	+0.399 0747	+0.398 5073	-171

FOR GREENWICH MEAN NOON AND MIDNIGHT.

Date.	X		Reduc. to Mean Eq'x of Jan. c.	Y		Reduc. to Mean Eq'x of Jan. c.	Z		Re M Eq Ja
	True Equinox.	True Equinox.	True Equinox.	True Equinox.	True Equinox.	True Equinox.	True Equinox.	True Equinox.	True Equinox.
	Noon.	Midnight.	Noon.	Noon.	Midnight.	Noon.	Noon.	Midnight.	Noon.
July 1	-0.151 4288	-0.159 7873	+1769	+0.922 3295	+0.921 1508	+ 370	+0.400 1248	+0.399 6138	-1
2	0.168 1350	0.176 4712	1773	0.919 9075	0.918 5994	398	0.399 0747	0.398 5075	1
3	0.184 7954	0.193 1070	1777	0.917 2266	0.915 7893	426	0.397 9123	0.397 2890	1
4	0.201 4054	0.209 6900	1780	0.914 2875	0.912 7213	454	0.396 6377	0.395 9585	1
5	0.217 9602	0.226 2154	1783	0.911 0908	0.909 3959	482	0.395 2513	0.394 5162	1
6	-0.234 4550	-0.242 6783	+1785	+0.907 6369	+0.905 8137	+ 511	+0.393 7532	+0.392 9624	-1
7	0.250 8849	0.259 0740	1786	0.903 9266	0.901 9756	540	0.392 1437	0.391 2973	1
8	0.267 2451	0.275 3975	1787	0.899 9609	0.897 8826	569	0.390 4232	0.389 5215	
9	0.283 5307	0.291 6440	1787	0.895 7408	0.893 5356	598	0.388 5922	0.387 6354	
10	0.299 7368	0.307 8083	1787	0.891 2672	0.888 9357	627	0.386 6511	0.385 6395	
11	-0.315 8587	-0.323 8865	+1786	+0.886 5412	+0.884 0840	+ 656	+0.384 6005	+0.383 5342	-
12	0.331 8915	0.339 8730	1784	0.881 5642	0.878 9820	685	0.382 4408	0.381 3202	
13	0.347 8303	0.355 7629	1782	0.876 3376	0.873 6312	714	0.380 1727	0.378 9983	
14	0.363 6702	0.371 5516	1779	0.870 8630	0.868 0333	744	0.377 7971	0.376 5691	-
15	0.379 4065	0.387 2344	1775	0.865 1422	0.862 1900	773	0.375 3145	0.374 0334	+
16	-0.395 0346	-0.402 8066	+1771	+0.859 1768	+0.856 1030	+ 803	+0.372 7259	+0.371 3921	+
17	0.410 5499	0.418 2638	1766	0.852 9687	0.849 7743	832	0.370 0321	0.368 6461	
18	0.425 9477	0.433 6012	1761	0.846 5201	0.843 2062	862	0.367 2341	0.365 7963	
19	0.441 2237	0.448 8148	1755	0.839 8330	0.836 4007	891	0.364 3328	0.362 8436	
20	0.456 3739	0.463 9004	1748	0.832 9096	0.829 3600	921	0.361 3290	0.359 7890	
21	-0.471 3939	-0.478 8538	+1740	+0.825 7521	+0.822 0863	+ 950	+0.358 2239	+0.356 6337	+
22	0.486 2796	0.493 6710	1732	0.818 3628	0.814 5819	979	0.355 0185	0.353 3785	
23	0.501 0274	0.508 3484	1723	0.810 7439	0.806 8491	1008	0.351 7137	0.350 0243	
24	0.515 6334	0.522 8820	1714	0.802 8978	0.798 8902	1037	0.348 3104	0.346 5721	
25	0.530 0938	0.537 2683	1704	0.794 8267	0.790 7074	1066	0.344 8096	0.343 0230	
26	-0.544 4051	-0.551 5037	+1693	+0.786 5327	+0.782 3027	+1095	+0.341 2123	+0.339 3776	+
27	0.558 5636	0.565 5843	1681	0.778 0178	0.773 6782	1124	0.337 5191	0.335 6369	
28	0.572 5654	0.579 5064	1669	0.769 2842	0.764 8360	1153	0.333 7311	0.331 8018	
29	0.586 4069	0.593 2663	1656	0.760 3339	0.755 7782	1181	0.329 8490	0.327 8730	
30	0.600 0842	0.606 8601	1642	0.751 1692	0.746 5071	1209	0.325 8738	0.323 8516	
31	-0.613 5934	-0.620 2837	+1628	+0.741 7921	+0.737 0245	+1237	+0.321 8064	+0.319 7384	+
Aug. 1	0.626 9305	0.633 5333	1613	0.732 2047	0.727 3330	1265	0.317 6476	0.315 5343	
2	0.640 0916	0.646 6048	1597	0.722 4096	0.717 4349	1293	0.313 3986	0.311 2406	
3	0.653 0727	0.659 4945	1581	0.712 4092	0.707 3328	1320	0.309 0604	0.306 8582	
4	0.665 8698	0.672 1981	1564	0.702 2060	0.697 0292	1347	0.304 6341	0.302 3882	
5	-0.678 4789	-0.684 7117	+1546	+0.691 8027	+0.686 5269	+1374	+0.300 1208	+0.297 8319	+
6	0.690 8061	0.697 0316	1528	0.681 2021	0.675 8287	1401	0.295 5218	0.293 1905	
7	0.703 1177	0.709 1538	1509	0.670 4071	0.664 9376	1427	0.290 8383	0.288 4652	
8	0.715 1396	0.721 0745	1490	0.659 4205	0.653 8563	1453	0.286 0715	0.283 6573	
9	0.726 9580	0.732 7897	1470	0.648 2453	0.642 5880	1479	0.281 2228	0.278 7683	
10	-0.738 5691	-0.744 2958	+1449	+0.636 8848	+0.631 1361	+1504	+0.276 2938	+0.273 7995	+
11	0.749 9693	0.755 5893	1428	0.625 3423	0.619 5038	1529	0.271 2857	0.268 7524	
12	0.761 1552	0.766 6666	1406	0.613 6211	0.607 6946	1554	0.266 2000	0.263 6287	
13	0.772 1230	0.777 5240	1383	0.601 7247	0.595 7120	1579	0.261 0386	0.258 4299	
14	0.782 8692	0.788 1583	1360	0.589 6569	0.583 5598	1603	0.255 8029	0.253 1576	
15	-0.793 3908	-0.798 5665	+1336	+0.577 4213	+0.571 2417	+1627	+0.250 4944	+0.247 8134	+
16	0.803 6850	0.808 7457	+1311	+0.565 0216	+0.558 7615	+1650	+0.245 1149	+0.242 3990	+

FOR GREENWICH MEAN NOON AND MIDNIGHT.

No.	X		Reduc. to Mean Eq'x of Jan. o.	Y		Reduc. to Mean Eq'x of Jan. o.	Z		Reduc. to Mean Eq'x of Jan. o.
	True Equinox.			True Equinox.			True Equinox.		
	Noon.	Midnight.	Noon.	Noon.	Midnight.	Noon.	Noon.	Midnight.	Noon.
Aug. 16	-0.803 6850	-0.808 7457	+1311	+0.565 0216	+0.558 7615	+1650	+0.245 1149	+0.242 3990	+494
17	0.813 7485	0.818 6929	1286	0.552 4617	0.546 1228	1673	0.239 6660	0.236 9161	508
18	0.823 5787	0.828 4055	1260	0.539 7452	0.533 3295	1696	0.234 1495	0.231 3663	522
19	0.833 1730	0.837 8808	1234	0.526 8760	0.520 3852	1718	0.228 5668	0.225 7512	537
20	0.842 5287	0.847 1164	1207	0.513 8577	0.507 2939	1739	0.222 9197	0.220 0725	551
21	-0.851 6436	-0.856 1101	+1180	+0.500 6943	+0.494 0593	+1760	+0.217 2097	+0.214 3316	+565
22	0.860 5155	0.864 8596	1152	0.487 3893	0.480 6848	1781	0.211 4384	0.208 5302	579
23	0.869 1421	0.873 3627	1123	0.473 9462	0.467 1740	1801	0.205 6073	0.202 6697	593
24	0.877 5210	0.881 6168	1094	0.460 3687	0.453 5306	1821	0.199 7178	0.196 7517	607
25	0.885 6498	0.889 6197	1064	0.446 6603	0.439 7581	1840	0.193 7715	0.190 7775	621
26	-0.893 5263	-0.897 3692	+1034	+0.432 8244	+0.425 8598	+1859	+0.187 7699	+0.184 7488	+635
27	0.901 1481	0.904 8628	1003	0.418 8646	0.411 8394	1877	0.181 7145	0.178 6670	648
28	0.908 5129	0.912 0982	972	0.404 7845	0.397 7004	1895	0.175 6066	0.172 5335	661
29	0.915 6183	0.919 0729	940	0.390 5877	0.383 4467	1912	0.169 4480	0.166 3502	674
30	0.922 4618	0.925 7847	908	0.376 2780	0.369 0820	1929	0.163 2404	0.160 1186	687
31	-0.929 0412	-0.932 2310	+ 875	+0.361 8591	+0.354 6099	+1945	+0.156 9852	+0.153 8403	+700
Sept. 1	0.935 3539	0.938 4096	842	0.347 3350	0.340 0348	1961	0.150 6842	0.147 5171	712
2	0.941 3978	0.944 3183	809	0.332 7098	0.325 3605	1976	0.144 3392	0.141 1507	724
3	0.947 1707	0.949 9548	775	0.317 9874	0.310 5910	1991	0.137 9518	0.134 7428	736
4	0.952 6704	0.955 3172	741	0.303 1719	0.295 7306	2005	0.131 5239	0.128 2954	748
5	-0.957 8949	-0.960 4033	+ 706	+0.288 2676	+0.280 7835	+2019	+0.125 0576	+0.121 8105	+760
6	0.962 8421	0.965 2111	671	0.273 2789	0.265 7542	2032	0.118 5545	0.115 2898	772
7	0.967 5100	0.969 7387	636	0.258 2100	0.250 6469	2044	0.112 0166	0.108 7352	783
8	0.971 8969	0.973 9844	600	0.243 0654	0.235 4661	2056	0.105 4458	0.102 1487	794
9	0.976 0009	0.977 9464	564	0.227 8496	0.220 2166	2067	0.098 8442	0.095 5326	805
10	-0.979 8205	-0.981 6232	+ 527	+0.212 5676	+0.204 9032	+2078	+0.092 2140	+0.088 8888	+816
11	0.983 3544	0.985 0137	490	0.197 2239	0.189 5304	2088	0.085 5572	0.082 2194	827
12	0.986 6012	0.988 1167	453	0.181 8233	0.174 1032	2097	0.078 8758	0.075 5265	837
13	0.989 5600	0.990 9311	416	0.166 3707	0.158 6264	2106	0.072 1718	0.068 8121	847
14	0.992 2299	0.993 4563	378	0.150 8708	0.143 1046	2114	0.065 4476	0.062 0786	857
15	-0.994 6102	-0.995 6916	+ 340	+0.135 3283	+0.127 5425	+2121	+0.058 7052	+0.055 3277	+867
16	0.996 7004	0.997 6366	302	0.119 7478	0.111 9447	2128	0.051 9464	0.048 5615	876
17	0.998 5002	0.999 2910	263	0.104 1339	0.096 3159	2134	0.045 1731	0.041 7818	885
18	1.000 0091	1.000 6543	224	0.088 4913	0.080 6606	2140	0.038 3878	0.034 9910	894
19	1.001 2267	1.001 7262	185	0.072 8243	0.064 9830	2145	0.031 5918	0.028 1905	902
20	-1.002 1529	-1.002 5066	+ 146	+0.057 1372	+0.049 2875	+2149	+0.024 7872	+0.021 3822	+910
21	1.002 7874	1.002 9953	106	0.041 4345	0.033 5786	2153	0.017 9757	0.014 5680	918
22	1.003 1302	1.003 1921	66	0.025 7204	0.017 8604	2156	0.011 1592	0.007 7496	926
23	1.003 1809	1.003 0969	+ 26	+0.009 9991	+0.002 1370	2158	+0.004 3395	+0.000 9290	933
24	1.002 9391	1.002 7084	- 14	-0.005 7252	-0.013 5871	2160	-0.002 4816	-0.005 8920	940
25	-1.002 4046	-1.002 0276	- 54	-0.021 4481	-0.029 3076	+2161	-0.009 3021	-0.012 7116	+947
26	1.001 5774	1.001 0539	95	0.037 1652	0.045 0203	2162	0.016 1203	0.019 5279	954
27	1.000 4572	0.999 7872	136	0.052 8723	0.060 7206	2162	0.022 9343	0.026 3391	960
28	0.999 0438	0.998 2271	177	0.068 5648	0.076 4042	2161	0.029 7422	0.033 1432	966
29	0.997 3370	0.996 3735	218	0.084 2383	0.092 0665	2160	0.036 5420	0.039 9382	972
30	-0.995 3367	-0.994 2265	- 259	-0.099 8883	-0.107 7029	+2158	-0.043 3316	-0.046 7220	+977
Oct. 1	-0.993 0430	-0.991 7862	- 300	-0.115 5099	-0.123 3087	+2155	-0.050 1091	-0.053 4927	+982

FOR GREENWICH MEAN NOON AND MIDNIGHT.

Date.	X		Reduc. to Mean Eq'x of Jan. o.	Y		Reduc. to Mean Eq'x of Jan. o.	Z		
	True Equinox.			True Equinox.			True Equinox.		
	Noon.	Midnight.		Noon.	Midnight.		Noon.	Midnight.	
Oct.	1	-0.993 0430	-0.991 7862	-300	-0.115 5099	-0.123 3087	+2155	-0.050 1091	-0.053 4927
	2	0.990 4562	0.989 0530	342	0.131 0988	0.138 8796	2152	0.056 8725	0.060 2482
	3	0.987 5765	0.986 0269	383	0.146 6504	0.154 4107	2148	0.063 6197	0.066 9866
	4	0.984 4041	0.982 7082	424	0.162 1599	0.169 8972	2143	0.070 3487	0.073 7057
	5	0.980 9393	0.979 0975	465	0.177 6225	0.185 3346	2138	0.077 0574	0.080 4035
	6	-0.977 1828	-0.975 1953	-507	-0.193 0332	-0.200 7176	+2132	-0.083 7436	-0.087 0775
	7	0.973 1352	0.971 0025	549	0.208 3873	0.216 0416	2126	0.090 4050	0.093 7258
	8	0.968 7973	0.966 5198	590	0.223 6798	0.231 3014	2119	0.097 0396	0.100 3462
	9	0.964 1702	0.961 7485	632	0.238 9057	0.246 4922	2111	0.103 6452	0.106 9364
	10	0.959 2550	0.956 6898	674	0.254 0601	0.261 6089	2103	0.110 2196	0.113 4945
	11	-0.954 0531	-0.951 3452	-716	-0.269 1379	-0.276 6465	+2094	-0.116 7607	-0.120 0180
	12	0.948 5662	0.945 7164	757	0.284 1342	0.291 6004	2085	0.123 2662	0.126 5050
	13	0.942 7961	0.939 8054	799	0.299 0446	0.306 4661	2075	0.129 7343	0.132 9537
	14	0.936 7446	0.933 6139	841	0.313 8644	0.321 2387	2064	0.136 1629	0.139 3617
	15	0.930 4137	0.927 1442	882	0.328 5889	0.335 9140	2053	0.142 5500	0.145 7275
	16	-0.923 8056	-0.920 3983	-923	-0.343 2138	-0.350 4875	+2041	-0.148 8939	-0.152 0490
	17	0.916 9225	0.913 3785	964	0.357 7347	0.364 9549	2028	0.155 1926	0.158 3245
	18	0.909 7664	0.906 0866	1005	0.372 1476	0.379 3123	2015	0.161 4444	0.164 5522
	19	0.902 3392	0.898 5246	1046	0.386 4484	0.393 5554	2001	0.167 6476	0.170 7304
	20	0.894 6431	0.890 6949	1087	0.400 6329	0.407 6802	1987	0.173 8005	0.176 8575
	21	-0.886 6804	-0.882 5997	-1128	-0.414 6970	-0.421 6827	+1972	-0.179 9013	-0.182 9316
	22	0.878 4532	0.874 2411	1169	0.428 6369	0.435 5590	1956	0.185 9483	0.188 9511
	23	0.869 9634	0.865 6208	1210	0.442 4485	0.449 3050	1940	0.191 9398	0.194 9142
	24	0.861 2133	0.856 7413	1250	0.456 1279	0.462 9167	1923	0.197 8741	0.200 8192
	25	0.852 2051	0.847 6049	1290	0.469 6710	0.476 3902	1905	0.203 7494	0.206 6643
	26	-0.842 9410	-0.838 2137	-1330	-0.483 0738	-0.489 7213	+1887	-0.209 5638	-0.212 4477
	27	0.833 4233	0.828 5701	1370	0.496 3322	0.502 9060	1868	0.215 3158	0.218 1678
	28	0.823 6544	0.818 6765	1410	0.509 4421	0.515 9401	1848	0.221 0035	0.223 8226
	29	0.813 6367	0.808 5353	1450	0.522 3995	0.528 8198	1828	0.226 6250	0.229 4105
	30	0.803 3727	0.798 1493	1489	0.535 2004	0.541 5409	1807	0.232 1788	0.234 9297
	31	-0.792 8651	-0.787 5208	-1528	-0.547 8407	-0.554 0993	+1786	-0.237 6630	-0.240 3784
Nov.	1	0.782 1167	0.776 6530	1567	0.560 3163	0.566 4911	1764	0.243 0758	0.245 7548
	2	0.771 1301	0.765 5485	1606	0.572 6232	0.578 7121	1741	0.248 4153	0.251 0570
	3	0.759 9084	0.754 2103	1644	0.584 7572	0.590 7580	1718	0.253 6797	0.256 2831
	4	0.748 4545	0.742 6415	1682	0.596 7140	0.602 6247	1694	0.258 8671	0.261 4314
	5	-0.736 7716	-0.730 8453	-1720	-0.608 4897	-0.614 3084	+1670	-0.263 9758	-0.266 5002
	6	0.724 8632	0.718 8257	1757	0.620 0802	0.625 8047	1645	0.269 0040	0.271 4874
	7	0.712 7332	0.706 5861	1794	0.631 4814	0.637 1098	1620	0.273 9500	0.276 3916
	8	0.700 3850	0.694 1303	1831	0.642 6894	0.648 2198	1594	0.278 8120	0.281 2110
	9	0.687 8225	0.681 4622	1868	0.653 7004	0.659 1308	1567	0.283 5883	0.285 9438
	10	-0.675 0500	-0.668 5863	-1904	-0.664 5105	-0.669 8391	+1540	-0.288 2774	-0.290 5887
	11	0.662 0718	0.655 5069	1940	0.675 1163	0.680 3416	1512	0.292 8777	0.295 1441
	12	0.648 8922	0.642 2281	1975	0.685 5147	0.690 6351	1484	0.297 3879	0.299 6088
	13	0.635 5152	0.628 7541	2010	0.695 7025	0.700 7164	1455	0.301 8067	0.303 9814
	14	0.621 9453	0.615 0893	2045	0.705 6766	0.710 5826	1426	0.306 1328	0.308 2607
	15	-0.608 1867	-0.601 2340	-2079	-0.715 4341	-0.720 2308	+1396	-0.310 3650	-0.312 4455
	16	-0.594 2436	-0.587 2041	-2113	-0.724 9722	-0.729 6580	+1365	-0.314 5021	-0.316 5346

FOR GREENWICH MEAN NOON AND MIDNIGHT.

Date.	X		Reduc. to Mean Eq'x of Jan. o.	Y		Reduc. to Mean Eq'x of Jan. o.	Z		Reduc. to Mean Eq'x of Jan. o.
	True Equinox.			True Equinox.			True Equinox.		
	Noon.	Midnight.	Noon.	Noon.	Midnight.	Noon.	Noon.	Midnight.	Noon.
Nov. 16	-0.594 2436	-0.587 2041	-2113	-0.724 9722	-0.729 6580	+1365	-0.314 5021	-0.316 5346	+846
17	0.580 1201	0.572 9920	2146	0.734 2880	0.738 8618	1334	0.318 5429	0.320 5268	835
18	0.565 8205	0.558 6060	2179	0.743 3790	0.747 8394	1302	0.322 4862	0.324 4210	823
19	0.551 3490	0.544 0500	2212	0.752 2426	0.756 5883	1270	0.326 3310	0.328 2161	811
20	0.536 7096	0.529 3283	2244	0.760 8761	0.765 1057	1237	0.330 0762	0.331 9111	799
21	-0.521 9065	-0.514 4448	-2276	-0.769 2769	-0.773 3893	+1204	-0.333 7206	-0.335 5047	+786
22	0.506 9438	0.499 4040	2307	0.777 4426	0.781 4365	1170	0.337 2631	0.338 9958	773
23	0.491 8260	0.484 2102	2338	0.785 3706	0.789 2446	1136	0.340 7026	0.342 3834	760
24	0.476 5573	0.468 8677	2368	0.793 0583	0.796 8113	1101	0.344 0380	0.345 6664	746
25	0.461 1419	0.453 3806	2398	0.800 5034	0.804 1342	1065	0.347 2683	0.348 8436	732
26	-0.445 5843	-0.437 7535	-2427	-0.807 7034	-0.811 2107	+1029	-0.350 3922	-0.351 9139	+717
27	0.429 8888	0.421 9906	2455	0.814 6558	0.818 0384	992	0.353 4087	0.354 8764	702
28	0.414 0597	0.406 0966	2483	0.821 3582	0.824 6149	955	0.356 3169	0.357 7300	687
29	0.398 1019	0.390 0762	2510	0.827 8083	0.830 9380	917	0.359 1156	0.360 4735	672
30	0.382 0200	0.373 9339	2537	0.834 0038	0.837 0054	878	0.361 8037	0.363 1060	657
Dec. 1	-0.365 8186	-0.357 6746	-2563	-0.839 9424	-0.842 8146	+ 839	-0.364 3803	-0.365 6264	+641
2	0.349 5025	0.341 3030	2588	0.845 6218	0.848 3636	799	0.366 8443	0.368 0338	625
3	0.333 0768	0.324 8244	2613	0.851 0397	0.853 6499	759	0.369 1947	0.370 3270	609
4	0.316 5465	0.308 2438	2637	0.856 1939	0.858 6714	719	0.371 4306	0.372 5053	592
5	0.299 9169	0.291 5666	2661	0.861 0823	0.863 4262	678	0.373 5511	0.374 5677	575
6	-0.283 1936	-0.274 7985	-2684	-0.865 7030	-0.867 9124	+ 637	-0.375 5552	-0.376 5134	+557
7	0.266 3820	0.257 9448	2706	0.870 0543	0.872 1285	595	0.377 4423	0.378 3418	539
8	0.249 4877	0.241 0113	2727	0.874 1347	0.876 0728	553	0.379 2118	0.380 0522	521
9	0.232 5163	0.224 0036	2748	0.877 9427	0.879 7442	510	0.380 8630	0.381 6441	503
10	0.215 4737	0.206 9275	2768	0.881 4772	0.883 1416	467	0.382 3955	0.383 1171	485
11	-0.198 3655	-0.189 7885	-2787	-0.884 7372	-0.886 2640	+ 423	-0.383 8089	-0.384 4708	+466
12	0.181 1971	0.172 5921	2805	0.887 7219	0.889 1108	379	0.385 1029	0.385 7050	447
13	0.163 9741	0.155 3438	2823	0.890 4306	0.891 6813	335	0.386 2772	0.386 8195	428
14	0.146 7018	0.138 0489	2840	0.892 8627	0.893 9749	290	0.387 3318	0.387 8141	409
15	0.129 3856	0.120 7127	2856	0.895 0177	0.895 9912	245	0.388 2663	0.388 6884	389
16	-0.112 0307	-0.103 3404	-2872	-0.896 8952	-0.897 7298	+ 199	-0.389 0804	-0.389 4424	+369
17	0.094 6424	0.085 9373	2886	0.898 4948	0.899 1902	153	0.389 7742	0.390 0759	349
18	0.077 2258	0.068 5085	2899	0.899 8161	0.900 3723	107	0.390 3474	0.390 5888	329
19	0.059 7861	0.051 0592	2912	0.900 8589	0.901 2758	60	0.390 7999	0.390 9809	309
20	0.042 3285	0.033 5945	2924	0.901 6229	0.901 9002	+ 13	0.391 1316	0.391 2521	288
21	-0.024 8580	-0.016 1196	-2935	-0.902 1078	-0.902 2456	- 34	-0.391 3423	-0.391 4023	+267
22	0.007 3799	+0.001 3604	2945	0.902 3136	0.902 3117	82	0.391 4321	0.391 4316	246
23	+0.010 1006	0.018 8402	2954	0.902 2400	0.902 0984	130	0.391 4008	0.391 3396	225
24	0.027 5786	0.036 3151	2962	0.901 8869	0.901 6056	178	0.391 2482	0.391 1265	204
25	0.045 0490	0.053 7797	2969	0.901 2544	0.900 8334	227	0.390 9745	0.390 7922	182
26	+0.062 5065	+0.071 2287	-2976	-0.900 3425	-0.899 7818	- 276	-0.390 5795	-0.390 3366	+160
27	0.079 9457	0.088 6568	2981	0.899 1512	0.898 4508	325	0.390 0633	0.389 7597	138
28	0.097 3615	0.106 0590	2985	0.897 6807	0.896 8407	374	0.389 4258	0.389 0616	116
29	0.114 7487	0.123 4298	2988	0.895 9310	0.894 9515	423	0.388 6671	0.388 2423	94
30	0.132 1018	0.140 7639	2991	0.893 9023	0.892 7834	473	0.387 7872	0.387 3019	72
31	+0.149 4154	+0.158 0557	-2993	-0.891 5948	-0.890 3366	- 523	-0.386 7863	-0.386 2405	+ 49
32	+0.166 6840	+0.175 2997	-2994	-0.889 0088	-0.887 6115	- 573	-0.385 6644	-0.385 0581	+ 27

208 MOON'S LONGITUDE AND LATITUDE, 1915.

FOR GREENWICH MEAN NOON AND MIDNIGHT

Day of Month.	JANUARY.		Day of Month.	FEBRUARY.		Day of Month.	MARCH.	
	True Long.	Latitude.		True Long.	Latitude.		True Long.	Latitude.
1.0	99 50 20.7	+3 46 41.2	1.0	147 39 5.3	-0 6 27.7	1.0	156 18 9.3	-0 53 4
1.5	106 7 18.0	3 22 39.9	1.5	154 25 43.9	0 43 47.7	1.5	163 17 26.9	1 31 1
2.0	112 27 0.0	2 55 56.4	2.0	161 15 26.6	1 20 47.9	2.0	170 20 54.3	2 7 4
2.5	118 49 27.3	2 26 46.9	2.5	168 7 58.1	1 56 53.6	2.5	177 27 58.7	2 42 3
3.0	125 14 40.3	1 55 30.6	3.0	175 3 2.4	2 31 30.2	3.0	184 38 2.7	3 15 1
3.5	131 42 40.1	+1 22 29.0	3.5	182 0 23.2	-3 4 4.0	3.5	191 50 25.4	-3 44 4
4.0	138 13 28.6	0 48 5.9	4.0	188 59 44.4	3 34 2.5	4.0	199 4 24.1	4 10 44
4.5	144 47 8.5	+0 12 47.0	4.5	196 0 50.0	4 0 55.6	4.5	206 19 15.5	4 32 46
5.0	151 23 43.7	-0 23 0.2	5.0	203 3 24.3	4 24 16.3	5.0	213 34 17.4	4 50 32
5.5	158 3 19.4	0 58 46.7	5.5	210 7 11.7	4 43 40.8	5.5	220 48 49.9	5 3 35
6.0	164 46 1.7	-1 34 2.6	6.0	217 11 56.8	-4 58 49.1	6.0	228 2 16.3	-5 11 47
6.5	171 31 56.9	2 8 17.5	6.5	224 17 24.0	5 9 25.9	6.5	235 14 4.4	5 15 3
7.0	178 21 11.1	2 41 0.5	7.0	231 23 17.4	5 15 20.3	7.0	242 23 46.8	5 13 23
7.5	185 13 49.5	3 11 40.7	7.5	238 29 20.3	5 16 26.3	7.5	249 31 1.0	5 6 54
8.0	192 9 55.6	3 39 48.0	8.0	245 35 15.2	5 12 42.6	8.0	256 35 29.4	4 55 48
8.5	199 9 30.0	-4 4 53.1	8.5	252 40 43.5	-5 4 13.2	8.5	263 36 59.1	-4 40 10.
9.0	206 12 29.2	4 26 28.4	9.0	259 45 25.7	4 51 7.2	9.0	270 35 21.3	4 20 49.
9.5	213 18 45.2	4 44 8.7	9.5	266 49 1.3	4 33 38.4	9.5	277 30 30.7	3 57 38
10.0	220 28 4.2	4 57 31.9	10.0	273 51 8.6	4 12 5.2	10.0	284 22 24.7	3 31 12.
10.5	227 40 5.9	5 6 19.5	10.5	280 51 25.3	3 46 50.4	10.5	291 11 2.7	3 1 59.
11.0	234 54 23.7	-5 10 17.9	11.0	287 49 29.1	-3 18 20.6	11.0	297 56 25.7	-2 30 28.
11.5	242 10 24.2	5 9 18.8	11.5	294 44 57.8	2 47 5.5	11.5	304 38 35.4	1 57 6.
12.0	249 27 28.0	5 3 20.3	12.0	301 37 30.1	2 13 37.0	12.0	311 17 34.0	1 22 26.
12.5	256 44 50.6	4 52 26.8	12.5	308 26 46.0	1 38 28.7	12.5	317 53 23.6	0 46 56.
13.0	264 1 43.6	4 36 49.6	13.0	315 12 27.7	1 2 14.8	13.0	324 26 5.9	-0 11 8.
13.5	271 17 16.7	-4 16 46.8	13.5	321 54 20.1	-0 25 29.1	13.5	330 55 42.7	+0 24 30
14.0	278 30 39.6	3 52 42.2	14.0	328 32 11.0	+0 11 15.7	14.0	337 22 15.4	0 59 32
14.5	285 41 4.0	3 25 4.9	14.5	335 5 51.9	0 47 28.6	14.5	343 45 45.6	1 33 30
15.0	292 47 45.1	2 54 28.1	15.0	341 35 18.2	1 22 40.9	15.0	350 6 15.2	2 6 0
15.5	299 50 3.7	2 21 27.6	15.5	348 0 29.4	1 56 26.8	15.5	356 23 46.5	2 36 41
16.0	306 47 27.3	-1 46 40.6	16.0	354 21 29.2	+2 28 23.4	16.0	2 38 22.8	+3 5 12
16.5	313 39 31.0	1 10 44.2	16.5	0 38 25.4	2 58 10.9	16.5	8 50 8.9	3 31 16
17.0	320 25 57.8	-0 34 14.3	17.0	6 51 30.1	3 25 32.4	17.0	14 59 11.3	3 54 40
17.5	327 6 39.0	+0 2 15.2	17.5	13 0 59.3	3 50 13.9	17.5	21 5 38.2	4 15 11
18.0	333 41 33.6	0 38 13.3	18.0	19 7 12.3	4 12 4.1	18.0	27 9 40.4	4 32 40
18.5	340 10 48.1	+1 13 12.2	18.5	25 10 31.9	+4 30 54.1	18.5	33 11 31.2	+4 46 59
19.0	346 34 35.6	1 46 47.5	19.0	31 11 24.1	4 46 36.7	19.0	39 11 26.6	4 58 3
19.5	352 53 15.1	2 18 38.1	19.5	37 10 17.6	4 59 6.5	19.5	45 9 45.2	5 5 48
20.0	359 7 10.5	2 48 25.9	20.0	43 7 43.1	5 8 19.5	20.0	51 6 48.5	5 10 13
20.5	5 16 49.9	3 15 55.8	20.5	49 4 13.0	5 14 12.9	20.5	57 3 0.7	5 11 17
21.0	11 22 44.5	+3 40 55.0	21.0	55 0 21.3	+5 16 44.6	21.0	62 58 48.9	+5 9 1
21.5	17 25 28.2	4 3 12.9	21.5	60 56 43.0	5 15 53.5	21.5	68 54 42.3	5 3 26
22.0	23 25 36.4	4 22 40.6	22.0	66 53 53.7	5 11 39.2	22.0	74 51 12.4	4 54 36
22.5	29 23 45.7	4 39 10.6	22.5	72 52 28.8	5 4 2.0	22.5	80 48 52.7	4 42 33
23.0	35 20 33.1	4 52 36.5	23.0	78 53 3.4	4 53 3.2	23.0	86 48 18.2	4 27 21
23.5	41 16 35.5	+5 2 52.7	23.5	84 56 11.8	+4 38 44.9	23.5	92 50 5.1	+4 9 6
24.0	47 12 29.1	5 9 54.4	24.0	91 2 26.9	4 21 10.8	24.0	98 54 50.0	3 47 54
24.5	53 8 49.2	5 13 37.7	24.5	97 12 19.3	4 0 26.0	24.5	105 3 9.5	3 23 53
25.0	59 6 9.4	5 13 59.4	25.0	103 26 17.1	3 36 37.5	25.0	111 15 39.6	2 57 13
25.5	65 5 1.5	5 10 56.9	25.5	109 44 45.0	3 9 54.8	25.5	117 32 54.8	2 28 5
26.0	71 5 55.0	+5 4 28.7	26.0	116 8 3.9	+2 40 30.4	26.0	123 55 27.1	+1 56 44
26.5	77 9 16.5	4 54 34.6	26.5	122 36 29.8	2 8 39.7	26.5	130 23 44.8	1 23 2.
27.0	83 15 29.7	4 41 15.8	27.0	129 10 13.5	1 34 42.0	27.0	136 58 11.9	0 48 3
27.5	89 24 54.9	4 24 35.3	27.5	135 49 20.0	0 59 0.3	27.5	143 39 6.3	+0 12 2.
28.0	95 37 48.7	4 4 38.3	28.0	142 33 47.9	+0 22 1.3	28.0	150 26 38.5	-0 24 21
28.5	101 54 24.2	+3 41 32.5	28.5	149 23 29.2	-0 15 44.3	28.5	157 20 50.7	-1 1 3
29.0	108 14 50.7	3 15 28.7	29.0	156 18 9.3	0 53 42.5	29.0	164 21 35.5	1 38 1
29.5	114 39 13.4	2 46 40.6	29.5	163 17 26.9	1 31 16.6	29.5	171 28 35.1	2 13 4
30.0	121 7 33.9	2 15 25.3	30.0	170 20 54.3	2 7 48.1	30.0	178 41 21.0	2 47 4
30.5	127 39 50.1	1 42 3.4	30.5	177 27 58.7	2 42 38.0	30.5	185 59 13.9	3 19 2
31.0	134 15 56.6	+1 6 58.8	31.0	184 38 2.7	-3 15 7.9	31.0	193 21 24.7	-3 47 5
31.5	140 55 45.2	+0 30 38.5	31.5	191 50 25.4	-3 44 41.3	31.5	200 46 55.7	-4 12 4

[Bph 13]

MOON'S LONGITUDE AND LATITUDE, 1915. 209

FOR GREENWICH MEAN NOON AND MIDNIGHT.

ay of mth.	APRIL.		Day of Month.	MAY.		Day of Month.	JUNE.	
	True Long.	Latitude.		True Long.	Latitude.		True Long.	Latitude.
	° ' "	° ' "		° ' "	° ' "		° ' "	° ' "
1.0	208 14 42.7	-4 33 28.9	1.0	247 12 22.5	-4 52 3.0	1.0	300 6 20.6	-1 42 54.3
1.5	215 43 37.6	4 49 31.7	1.5	254 44 54.7	4 39 55.2	1.5	307 8 7.1	1 7 8.0
2.0	223 12 31.5	5 0 36.9	2.0	262 13 3.3	4 23 5.5	2.0	314 2 37.6	-0 30 56.7
2.5	230 40 17.5	5 6 33.2	2.5	269 35 53.5	4 2 1.8	2.5	320 49 59.8	+0 5 5.7
3.0	238 5 53.1	5 7 17.8	3.0	276 52 43.8	3 37 16.4	3.0	327 30 29.8	0 40 28.8
3.5	245 28 32.2	-5 2 55.5	3.5	284 3 6.4	-3 9 24.1	3.5	334 4 30.5	+1 14 45.9
4.0	252 47 1.6	4 53 38.2	4.0	291 6 46.2	2 39 1.0	4.0	340 32 29.8	1 47 33.9
4.5	260 1 12.0	4 39 43.9	4.5	298 3 39.7	2 6 42.9	4.5	346 54 58.9	2 18 32.8
5.0	267 10 27.9	4 21 35.4	5.0	304 53 53.3	1 33 4.3	5.0	353 12 30.8	2 47 25.5
5.5	274 14 32.9	3 59 38.9	5.5	311 37 41.6	0 58 37.9	5.5	359 25 39.6	3 13 57.5
6.0	281 13 19.7	-3 34 23.1	6.0	318 15 25.3	-0 23 54.2	6.0	5 34 59.1	+3 37 56.5
6.5	288 6 48.8	3 6 18.0	6.5	324 47 29.7	+0 10 38.8	6.5	11 41 2.4	3 59 12.1
7.0	294 55 7.0	2 35 54.3	7.0	331 14 22.6	0 44 35.6	7.0	17 44 20.9	4 17 35.5
7.5	301 38 26.4	2 3 42.5	7.5	337 36 33.0	1 17 33.0	7.5	23 45 24.0	4 32 59.2
8.0	308 17 2.6	1 30 12.4	8.0	343 54 32.5	1 49 10.1	8.0	29 44 39.0	4 45 17.2
8.5	314 51 13.7	-0 55 53.2	8.5	350 8 48.6	+2 19 8.0	8.5	35 42 30.8	+4 54 24.0
9.0	321 21 18.8	-0 21 12.7	9.0	356 19 49.6	2 47 9.6	9.0	41 39 22.0	5 0 18.8
9.5	327 47 37.5	+0 13 22.4	9.5	2 28 1.4	3 12 59.6	9.5	47 35 32.5	5 2 56.7
10.0	334 10 28.7	0 47 26.8	10.0	8 33 47.9	3 36 24.4	10.0	53 31 20.1	5 2 17.9
10.5	340 30 10.2	1 20 36.6	10.5	14 37 30.4	3 57 12.0	10.5	59 27 0.5	4 58 23.0
11.0	346 46 58.5	+1 52 29.7	11.0	20 39 27.8	+4 15 12.0	11.0	65 22 47.8	+4 51 14.1
11.5	353 1 8.1	2 22 45.5	11.5	26 39 56.7	4 30 15.5	11.5	71 18 54.8	4 40 55.0
12.0	359 12 51.9	2 51 5.1	12.0	32 39 11.7	4 42 15.4	12.0	77 15 33.0	4 27 31.0
12.5	5 22 21.2	3 17 11.5	12.5	38 37 25.5	4 51 6.1	12.5	83 12 53.7	4 11 9.1
13.0	11 29 45.9	3 40 49.4	13.0	44 34 49.3	4 56 43.7	13.0	89 11 8.1	3 51 57.9
13.5	17 35 14.8	+4 1 45.9	13.5	50 31 33.6	+4 59 6.0	13.5	95 10 27.5	+3 30 7.8
14.0	23 38 56.1	4 19 49.9	14.0	56 27 48.3	4 58 12.5	14.0	101 11 4.2	3 5 50.7
14.5	29 40 57.7	4 34 52.3	14.5	62 23 43.3	4 54 4.4	14.5	107 13 11.8	2 39 20.1
15.0	35 41 27.9	4 46 46.1	15.0	68 19 29.2	4 46 44.6	15.0	113 17 5.3	2 10 51.0
15.5	41 40 35.7	4 55 26.5	15.5	74 15 17.7	4 36 17.5	15.5	119 23 1.5	1 40 39.8
16.0	47 38 31.4	+5 0 50.3	16.0	80 11 21.7	+4 22 49.1	16.0	125 31 19.0	+1 9 4.4
16.5	53 35 26.9	5 2 56.2	16.5	86 7 56.2	4 6 26.7	16.5	131 42 18.5	0 36 24.0
17.0	59 31 36.0	5 1 44.6	17.0	92 5 18.4	3 47 19.1	17.0	137 56 22.5	+0 2 59.1
17.5	65 27 15.0	4 57 17.4	17.5	98 3 48.0	3 25 36.4	17.5	144 13 55.2	-0 30 48.4
18.0	71 22 42.7	4 49 37.8	18.0	104 3 47.3	3 1 29.7	18.0	150 35 22.1	1 4 35.5
18.5	77 18 20.8	+4 38 50.2	18.5	110 5 41.1	+2 35 11.5	18.5	157 1 9.3	-1 37 57.7
19.0	83 14 33.6	4 25 0.3	19.0	116 9 57.1	2 6 55.5	19.0	163 31 42.7	2 10 29.1
19.5	89 11 48.2	4 8 14.8	19.5	122 17 5.2	1 36 56.7	19.5	170 7 27.3	2 41 42.8
20.0	95 10 34.4	3 48 41.2	20.0	128 27 37.5	1 5 31.6	20.0	176 48 45.7	3 11 10.8
20.5	101 11 24.5	3 26 28.1	20.5	134 42 7.6	+0 32 58.0	20.5	183 35 57.2	3 38 23.8
21.0	107 14 52.9	+3 1 45.4	21.0	141 1 9.9	-0 0 24.4	21.0	190 29 15.9	-4 2 52.2
21.5	113 21 35.7	2 34 44.3	21.5	147 25 18.9	0 34 13.8	21.5	197 28 49.1	4 24 6.4
22.0	119 32 9.9	2 5 37.4	22.0	153 55 8.0	1 8 6.6	22.0	204 34 36.2	4 41 37.4
22.5	125 47 12.9	1 34 39.2	22.5	160 31 8.2	1 41 36.9	22.5	211 46 26.8	4 54 58.2
23.0	132 7 22.0	1 2 6.3	23.0	167 13 46.6	2 14 16.1	23.0	219 3 59.9	5 3 44.6
23.5	138 33 12.7	+0 28 17.6	23.5	174 3 25.0	-2 45 33.5	23.5	226 26 42.7	-5 7 36.8
24.0	145 5 17.7	-0 6 24.9	24.0	181 0 17.4	3 14 56.5	24.0	233 53 51.0	5 6 20.7
24.5	151 44 5.4	0 41 36.2	24.5	188 4 28.4	3 41 50.9	24.5	241 24 29.7	4 59 49.3
25.0	158 29 58.2	1 16 48.2	25.0	195 15 51.3	4 5 42.0	25.0	248 57 34.5	4 48 3.6
25.5	165 23 11.1	1 51 29.2	25.5	202 34 6.7	4 25 55.4	25.5	256 31 54.0	4 31 13.2
26.0	172 23 49.5	-2 25 4.6	26.0	209 58 40.9	-4 41 59.0	26.0	264 6 12.7	-4 9 36.6
26.5	179 31 47.2	2 56 57.1	26.5	217 28 46.5	4 53 24.4	26.5	271 39 14.3	3 43 40.4
27.0	186 46 45.4	3 26 27.9	27.0	225 3 22.5	4 59 48.8	27.0	279 9 45.0	3 13 58.3
27.5	194 8 12.1	3 52 58.1	27.5	232 41 15.8	5 0 56.5	27.5	286 36 36.9	2 41 9.3
28.0	201 35 21.2	4 15 50.0	28.0	240 21 4.6	4 56 40.6	28.0	293 58 50.1	2 5 55.8
28.5	209 7 13.6	-4 34 29.2	28.5	248 1 21.8	-4 47 3.8	28.5	301 15 34.9	-1 29 1.7
29.0	216 42 38.6	4 48 26.4	29.0	255 40 39.0	4 32 18.4	29.0	308 26 12.8	0 51 10.6
29.5	224 20 16.9	4 57 19.4	29.5	263 17 30.9	4 12 45.5	29.5	315 30 17.1	0 13 4.0
30.0	231 58 43.8	5 0 54.5	30.0	270 50 38.9	3 48 54.1	30.0	322 27 32.6	+0 24 39.8
30.5	239 36 33.4	4 59 7.4	30.5	278 18 54.8	3 21 19.3	30.5	329 17 54.5	1 1 26.6
31.0	247 12 22.5	-4 52 3.0	31.0	285 41 22.8	-2 50 40.3	31.0	336 1 27.5	+1 36 46.5
31.5	254 44 54.7	-4 39 55.2	31.5	292 57 20.8	-2 17 38.3	31.5	342 38 24.5	+2 10 14.1

210 MOON'S LONGITUDE AND LATITUDE, 1915.

FOR GREENWICH MEAN NOON AND MIDNIGHT.

Day of Month.	JULY.		Day of Month.	AUGUST.		Day of Month.	SEPTEMBER.	
	True Long.	Latitude.		True Long.	Latitude.		True Long.	Latitude.
1.0	336 1 27.5	+1 36 46.5	1.0	22 30 48.8	+4 47 25.1	1.0	66 37 8.6	+4 57 1
1.5	342 38 24.5	2 10 14.1	1.5	28 38 47.6	4 59 55.9	1.5	72 33 18.2	4 44 37.
2.0	349 9 5.3	2 41 28.4	2.0	34 43 23.4	5 8 57.5	2.0	78 29 24.6	4 29 10.
2.5	355 33 54.8	3 10 12.1	2.5	40 45 9.4	5 14 30.0	2.5	84 26 3.9	4 10 48.
3.0	1 53 22.0	3 36 11.4	3.0	46 44 39.7	5 16 34.6	3.0	90 23 51.8	3 49 40.
3.5	8 7 58.6	+3 59 15.4	3.5	52 42 28.5	+5 15 13.6	3.5	96 23 23.1	+3 25 55.6
4.0	14 18 17.9	4 19 15.8	4.0	58 39 9.8	5 10 30.2	4.0	102 25 11.4	2 59 45.8
4.5	20 24 54.2	4 36 6.2	4.5	64 35 16.8	5 2 28.1	4.5	108 29 48.4	2 31 22.4
5.0	26 28 22.1	4 49 41.9	5.0	70 31 21.8	4 51 11.9	5.0	114 37 43.4	2 1 0.0
5.5	32 29 15.3	4 59 59.7	5.5	76 27 55.6	4 36 47.4	5.5	120 49 22.8	1 28 54.9
6.0	38 28 6.6	+5 6 57.7	6.0	82 25 27.5	+4 19 21.3	6.0	127 5 9.6	+0 55 25.6
6.5	44 25 27.3	5 10 34.7	6.5	88 24 24.5	3 59 1.4	6.5	133 25 22.7	+0 20 52.9
7.0	50 21 47.1	5 10 50.6	7.0	94 25 11.5	3 35 56.9	7.0	139 50 16.4	-0 14 19.5
7.5	56 17 33.6	5 7 46.4	7.5	100 28 11.1	3 10 19.0	7.5	146 19 59.8	0 49 45.4
8.0	62 13 12.2	5 1 24.3	8.0	106 33 43.4	2 42 20.5	8.0	152 54 36.8	1 24 50.4
8.5	68 9 6.2	+4 51 47.7	8.5	112 42 5.6	+2 12 16.3	8.5	159 34 5.4	-1 59 22.0
9.0	74 5 36.7	4 39 1.1	9.0	118 53 32.4	1 40 23.6	9.0	166 18 17.9	2 32 30.5
9.5	80 3 2.5	4 23 10.3	9.5	125 8 15.6	1 7 1.7	9.5	173 7 0.7	3 3 49.3
10.0	86 1 40.7	4 4 22.9	10.0	131 26 24.4	+0 32 32.4	10.0	179 59 55.1	3 32 45.7
10.5	92 1 46.3	3 42 48.2	10.5	137 48 5.4	-0 2 40.5	10.5	186 56 37.4	3 58 48.4
11.0	98 3 32.7	+3 18 37.2	11.0	144 13 22.4	-0 38 11.3	11.0	193 56 39.9	-4 21 28.1
11.5	104 7 12.1	2 52 2.8	11.5	150 42 16.9	1 13 32.4	11.5	200 59 31.2	4 40 18.6
12.0	110 12 55.5	2 23 19.9	12.0	157 14 48.3	1 48 14.9	12.0	208 4 39.2	4 54 57.5
12.5	116 20 53.3	1 52 45.4	12.5	163 50 54.0	2 21 49.2	12.5	215 11 29.8	5 5 7.1
13.0	122 31 15.4	1 20 37.8	13.0	170 30 29.9	2 53 45.5	13.0	222 19 29.7	5 10 35.2
13.5	128 44 11.7	+0 47 17.5	13.5	177 13 30.2	-3 23 34.0	13.5	229 28 7.1	-5 11 14.6
14.0	134 59 52.3	+0 13 6.6	14.0	183 59 47.8	3 50 45.8	14.0	236 36 52.5	5 7 5.6
14.5	141 18 27.3	-0 21 31.4	14.5	190 49 14.6	4 14 53.7	14.5	243 45 18.7	4 58 9.8
15.0	147 40 7.5	0 56 11.8	15.0	197 41 41.5	4 35 32.4	15.0	250 53 2.9	4 44 39.6
15.5	154 5 4.4	1 30 28.7	15.5	204 36 58.6	4 52 19.3	15.5	257 59 45.1	4 26 47.1
16.0	160 33 29.8	-2 3 55.4	16.0	211 34 55.0	-5 4 55.0	16.0	265 5 8.7	-4 4 53.1
16.5	167 15 35.7	2 36 4.6	16.5	218 35 18.8	5 13 3.6	16.5	272 9 0.3	3 39 19.8
17.0	173 41 34.0	3 6 28.9	17.0	225 37 57.0	5 16 33.4	17.0	279 11 0.0	3 10 33.4
17.5	180 21 36.1	3 34 40.8	17.5	232 42 35.2	5 15 17.0	17.5	286 11 25.8	2 39 2.8
18.0	187 5 52.2	4 0 13.1	18.0	239 48 57.7	5 9 11.9	18.0	293 9 42.8	2 5 19.2
18.5	193 54 30.4	-4 22 39.2	18.5	246 56 46.9	-4 58 20.5	18.5	300 5 53.0	-1 29 55.4
19.0	200 47 36.1	4 41 33.9	19.0	254 5 43.4	4 42 50.3	19.0	306 59 49.6	0 53 24.2
19.5	207 45 10.7	4 56 33.7	19.5	261 15 25.8	4 22 54.4	19.5	313 51 25.4	-0 16 21.1
20.0	214 47 11.1	5 7 17.4	20.0	268 25 30.6	3 58 51.0	20.0	320 40 32.5	+0 20 41.1
20.5	221 53 28.7	5 13 26.9	20.5	275 35 32.5	3 31 3.3	20.5	327 27 2.4	0 57 9.4
21.0	229 3 48.6	-5 14 48.2	21.0	282 45 4.1	-2 59 59.0	21.0	334 10 46.1	+1 32 32.4
21.5	236 17 48.9	5 11 12.1	21.5	289 53 36.7	2 26 10.0	21.5	340 51 34.0	2 6 20.4
22.0	243 35 0.5	5 2 34.8	22.0	297 0 40.7	1 50 11.6	22.0	347 29 16.5	2 38 8.2
22.5	250 54 47.4	4 48 59.0	22.5	304 5 46.0	1 12 41.3	22.5	354 3 44.3	3 7 30.1
23.0	258 16 27.3	4 30 34.3	23.0	311 8 23.0	-0 34 17.7	23.0	0 34 49.2	3 34 8.1
23.5	265 39 12.5	-4 7 37.4	23.5	318 8 3.1	+0 4 20.4	23.5	7 2 24.4	+3 57 44.4
24.0	273 2 11.1	3 40 31.9	24.0	325 4 19.6	0 42 35.2	24.0	13 26 25.5	4 18 5.
24.5	280 24 28.9	3 9 47.7	24.5	331 56 48.7	1 19 50.7	24.5	19 46 50.5	4 35 1.
25.0	287 45 11.3	2 36 0.1	25.0	338 45 9.8	1 55 34.0	25.0	26 3 40.4	4 48 26.1
25.5	295 3 25.4	1 59 48.8	25.5	345 29 6.3	2 29 15.9	25.5	32 16 59.9	4 58 17.
26.0	302 18 21.5	-1 21 55.9	26.0	352 8 26.2	+3 0 31.0	26.0	38 26 57.3	+5 4 33.
26.5	309 29 15.1	0 43 4.3	26.5	358 43. 2.4	3 28 58.2	26.5	44 33 44.6	5 7 16.
27.0	316 35 28.0	-0 3 56.3	27.0	5 12 52.8	3 54 20.8	27.0	50 37 37.8	5 6 29.
27.5	323 36 29.4	+0 34 47.8	27.5	11 38 0.4	4 16 26.0	27.5	56 38 56.7	5 2 18.
28.0	330 31 56.6	1 12 30.9	28.0	17 58 33.2	4 35 4.8	28.0	62 38 4.4	4 54 49.
28.5	337 21 34.7	+1 48 40.1	28.5	24 14 43.9	+4 50 11.4	28.5	68 35 27.6	+4 44 10.
29.0	344 5 16.8	2 22 47.1	29.0	30 26 49.7	5 1 43.0	29.0	74 31 36.1	4 30 29.
29.5	350 43 3.5	2 54 28.0	29.5	36 35 11.7	5 9 39.0	29.5	80 27 2.4	4 13 55.
30.0	357 15 2.4	3 23 23.5	30.0	42 40 14.6	5 14 0.9	30.0	86 22 11.1	3 54 38.
30.5	3 41 27.3	3 49 18.7	30.5	48 42 26.4	5 14 51.6	30.5	92 18 2.8	3 32 47.
31.0	10 2 37.7	+4 12 2.3	31.0	54 42 17.4	+5 12 15.1	31.0	98 15 3.7	+3 8 34.
31.5	16 18 55.2	+4 31 26.2	31.5	60 40 20.1	+5 6 16.6	31.5	104 13 44.6	+2 42 10.

MOON'S LONGITUDE AND LATITUDE, 1915. 211

FOR GREENWICH MEAN NOON AND MIDNIGHT.

OCTOBER.				NOVEMBER.				DECEMBER.												
Day of Month.	True Long.		Latitude.	Day of Month.	True Long.		Latitude.	Day of Month.	True Long.		Latitude.									
"	"	"	"	"	"	"	"	"	"	"	"									
1.0	98	15	3.7	+3	8	34.4	1.0	142	50	34.7	-0	50	19.8	1.0	177	7	4.8	-3	43	11.2
1.5	104	13	44.6	2	42	10.5	1.5	149	11	33.2	1	23	4.4	1.5	183	51	42.2	4	6	5.4
2.0	110	14	50.8	2	13	48.4	2.0	155	38	42.4	1	55	15.8	2.0	190	43	50.3	4	25	53.0
2.5	116	19	1.2	1	43	41.8	2.5	162	12	31.8	2	26	27.5	2.5	197	43	35.7	4	42	5.2
3.0	122	26	53.7	1	12	6.2	3.0	168	53	24.5	2	56	10.7	3.0	204	50	53.8	4	54	14.2
3.5	128	39	4.4	+0	39	18.7	3.5	175	41	35.2	-3	23	54.9	3.5	212	5	26.9	-5	1	54.7
4.0	134	56	6.5	+0	5	38.6	4.0	182	37	8.9	3	49	8.2	4.0	219	26	43.4	5	4	45.1
4.5	141	18	29.5	-0	28	32.5	4.5	189	39	59.0	4	11	18.0	4.5	226	53	57.5	5	2	29.3
5.0	147	46	37.9	1	2	50.2	5.0	196	40	46.5	4	29	52.3	5.0	234	26	10.1	4	54	58.4
5.5	154	20	50.2	1	36	47.4	5.5	204	5	59.2	4	44	21.2	5.5	242	2	10.5	4	42	11.9
6.0	161	1	17.9	-2	9	54.9	6.0	211	27	51.8	-4	54	18.5	6.0	249	40	39.2	-4	24	18.5
6.5	167	48	4.0	2	41	41.3	6.5	218	54	27.1	4	59	23.5	6.5	257	20	11.2	4	1	36.5
7.0	174	41	2.6	3	11	33.5	7.0	226	24	37.6	4	59	22.1	7.0	264	59	20.1	3	34	33.3
7.5	181	39	58.1	3	38	57.6	7.5	233	57	8.7	4	54	8.1	7.5	272	36	42.2	3	3	43.7
8.0	188	44	25.1	4	3	20.1	8.0	241	30	42.0	4	43	44.2	8.0	280	11	0.1	2	29	48.6
8.5	195	53	48.8	-4	24	9.4	8.5	249	3	58.6	-4	28	22.0	8.5	287	41	5.7	-1	53	32.9
9.0	203	7	25.6	4	40	56.9	9.0	256	35	42.8	4	8	21.3	9.0	295	6	2.7	1	15	43.0
9.5	210	24	24.8	4	53	18.5	9.5	264	4	46.0	3	44	9.2	9.5	302	25	7.6	-0	37	4.7
10.0	217	43	50.6	5	0	55.6	10.0	271	30	9.0	3	16	18.6	10.0	309	37	49.9	+0	1	38.5
10.5	225	4	44.5	5	3	36.1	10.5	278	51	3.8	2	45	26.1	10.5	316	43	51.5	0	39	46.6
11.0	232	26	7.5	-5	1	15.6	11.0	286	6	53.9	-2	12	10.5	11.0	323	43	5.8	+1	16	43.8
11.5	239	47	2.9	4	53	56.7	11.5	293	17	14.9	1	37	11.4	11.5	330	35	36.2	1	51	59.2
12.0	247	6	38.7	4	41	49.1	12.0	300	21	53.6	1	1	7.7	12.0	337	21	34.4	2	25	6.6
12.5	254	24	9.0	4	25	9.2	12.5	307	20	46.6	-0	24	36.3	12.5	344	1	18.3	2	55	44.5
13.0	261	38	55.7	4	4	18.6	13.0	314	13	58.8	+0	11	48.2	13.0	350	35	10.5	3	23	35.3
13.5	268	50	29.0	-3	39	43.4	13.5	321	1	41.6	+0	47	34.1	13.5	357	3	37.0	+3	48	25.3
14.0	275	58	27.2	3	11	53.3	14.0	327	44	11.3	1	22	12.7	14.0	3	27	5.5	4	10	3.8
14.5	283	2	36.4	2	41	20.0	14.5	334	21	47.4	1	55	18.5	14.5	9	46	4.8	4	28	22.9
15.0	290	2	50.0	2	8	36.6	15.0	340	54	51.5	2	26	28.8	15.0	16	1	3.5	4	43	17.0
15.5	296	59	7.3	1	34	16.6	15.5	347	23	45.6	2	55	23.8	15.5	22	12	29.5	4	54	42.6
16.0	303	51	32.0	-0	58	53.2	16.0	353	48	51.5	+3	21	46.5	16.0	28	20	49.2	+5	2	38.1
16.5	310	40	11.1	-0	22	59.0	16.5	0	10	30.0	3	45	22.4	16.5	34	26	27.5	5	7	3.3
17.0	317	25	13.9	+0	12	54.6	17.0	6	29	0.4	4	5	59.2	17.0	40	29	47.5	5	7	59.6
17.5	324	6	51.0	0	48	17.6	17.5	12	44	39.9	4	23	27.0	17.5	46	31	10.2	5	5	30.0
18.0	330	45	12.7	1	22	42.0	18.0	18	57	43.6	4	37	38.0	18.0	52	30	54.4	4	59	38.8
18.5	337	20	28.5	+1	55	41.4	18.5	25	8	24.4	+4	48	26.6	18.5	58	29	17.2	+4	50	31.6
19.0	343	52	47.0	2	26	51.7	19.0	31	16	53.5	4	55	49.4	19.0	64	26	34.1	4	38	15.6
19.5	350	22	15.1	2	55	51.0	19.5	37	23	20.5	4	59	45.0	19.5	70	22	59.2	4	22	59.5
20.0	356	48	57.8	3	22	20.0	20.0	43	27	53.4	5	0	14.0	20.0	76	18	45.6	4	4	53.2
20.5	3	12	58.8	3	46	1.9	20.5	49	30	39.6	4	57	19.1	20.5	82	14	5.6	3	44	8.1
21.0	9	34	20.2	+4	6	42.4	21.0	55	31	46.3	+4	51	4.0	21.0	88	9	11.4	+3	20	57.0
21.5	15	53	3.2	4	24	10.2	21.5	61	31	20.8	4	41	37.8	21.5	94	4	15.4	2	55	33.8
22.0	22	9	8.4	4	38	17.0	22.0	67	29	31.5	4	29	5.9	22.0	99	59	30.6	2	28	13.6
22.5	28	22	36.4	4	48	57.0	22.5	73	26	27.8	4	13	38.6	22.5	105	55	10.8	1	59	12.6
23.0	34	33	28.7	4	56	7.1	23.0	79	22	20.7	3	55	26.9	23.0	111	51	31.1	1	28	48.1
23.5	40	41	47.8	+4	59	46.8	23.5	85	17	23.6	+3	34	42.9	23.5	117	48	48.2	+0	57	18.1
24.0	46	47	38.2	4	59	58.1	24.0	91	11	52.4	3	11	39.7	24.0	123	47	20.7	+0	25	1.2
24.5	52	51	6.6	4	56	44.9	24.5	97	6	5.6	2	46	31.2	24.5	129	47	29.0	-0	7	43.3
25.0	58	52	22.4	4	50	13.1	25.0	103	0	24.4	2	19	32.0	25.0	135	49	35.7	0	40	35.4
25.5	64	51	38.0	4	40	30.2	25.5	108	55	13.0	1	50	57.6	25.5	141	54	5.4	1	13	14.5
26.0	70	49	9.0	+4	27	44.9	26.0	114	50	58.8	+1	21	3.9	26.0	148	1	24.5	-1	45	19.7
26.5	76	45	14.7	4	12	7.1	26.5	120	48	12.0	0	50	7.4	26.5	154	12	1.2	2	16	29.5
27.0	82	40	17.5	3	53	47.5	27.0	126	47	25.3	+0	18	25.2	27.0	160	26	24.9	2	46	21.8
27.5	88	34	43.2	3	32	57.7	27.5	132	49	13.7	-0	13	44.8	27.5	166	45	5.8	3	14	34.1
28.0	94	29	0.9	3	9	49.7	28.0	138	54	14.3	0	46	4.0	28.0	173	8	33.9	3	40	43.1
28.5	100	23	42.8	+2	44	36.2	28.5	145	3	5.4	-1	18	12.5	28.5	179	37	18.3	-4	4	25.1
29.0	106	19	23.8	2	17	30.4	29.0	151	16	26.0	1	49	49.3	29.0	186	11	46.2	4	25	16.1
29.5	112	16	41.1	1	48	46.1	29.5	157	34	54.5	2	20	32.1	29.5	192	52	21.6	4	42	52.2
30.0	118	16	13.9	1	18	38.1	30.0	163	59	8.2	2	49	57.1	30.0	199	39	23.7	4	56	49.6
30.5	124	18	42.6	0	47	22.0	30.5	170	29	41.6	3	17	39.1	30.5	206	33	5.6	5	6	45.4
31.0	130	24	48.4	+0	15	14.4	31.0	177	7	4.8	-3	43	11.2	31.0	213	33	32.9	-5	12	18.7
31.5	136	35	12.4	-0	17	26.2	31.5	183	51	42.2	-4	6	5.4	31.5	220	40	41.7	-5	13	11.2

212 MOON'S EQUATOR, LONGITUDE, ETC., 1915.

GREENWICH MEAN NOON.

Date.	MOON'S EQUATOR.			I'	Ω Mean Longitude of Moon's Ascending Node. Daily Motion, $-3'.177$.	C Moon's Mean Longitude.	Mean Solar Days.	Mo N in Lon
	i Inclination to the Earth's Equator.	Δ Ascending Node on Earth's Equator to Ascending Node on Ecliptic.	Ω' Ascending Node on Earth's Equator.					
	" "	" "	" "	" "	" "	" "		"
Jan. 0	22 8.9	147 10.4	2 5.5	224 35.9	329 5.9	90 44.9	0.1	1
10	22 9.4	146 36.9	2 7.4	225 42.7	328 34.1	222 30.8	0.2	2
20	22 9.8	146 3.4	2 9.2	226 49.6	328 2.4	354 16.6	0.3	3
30	22 10.3	145 29.9	2 11.1	227 56.4	327 30.6	126 2.4	0.4	4
Feb. 9	22 10.8	144 56.5	2 12.9	229 3.3	326 58.8	257 48.3	0.5	6
							0.6	7
19	22 11.3	144 23.0	2 14.8	230 10.1	326 27.1	29 34.1	0.7	9
Mar. 1	22 11.8	143 49.5	2 16.6	231 16.9	325 55.3	161 20.0	0.8	10
11	22 12.3	143 16.1	2 18.4	232 23.8	325 23.5	293 5.8	0.9	11
21	22 12.8	142 42.7	2 20.2	233 30.6	324 51.7	64 51.6	1.0	13
31	22 13.3	142 9.2	2 22.0	234 37.5	324 20.0	196 37.5	2.0	26
Apr. 10	22 13.9	141 35.8	2 23.8	235 44.3	323 48.2	328 23.3	3.0	39
20	22 14.4	141 2.4	2 25.5	236 51.2	323 16.4	100 9.1	4.0	52
30	22 14.9	140 29.1	2 27.3	237 58.0	322 44.6	231 55.0	5.0	65
May 10	22 15.5	139 55.7	2 29.0	239 4.8	322 12.9	3 40.8	6.0	79
20	22 16.0	139 22.4	2 30.7	240 11.7	321 41.1	135 26.7	7.0	92
							8.0	105
30	22 16.6	138 49.0	2 32.4	241 18.5	321 9.3	267 12.5	9.0	118
June 9	22 17.1	138 15.7	2 34.1	242 25.4	320 37.6	38 58.3	10.0	131
19	22 17.7	137 42.4	2 35.8	243 32.2	320 5.8	170 44.2	Hours.	"
29	22 18.3	137 9.2	2 37.4	244 39.0	319 34.0	302 30.0	1	0
July 9	22 18.9	136 35.9	2 39.0	245 45.9	319 2.2	74 15.9	2	1
							3	1
19	22 19.4	136 2.6	2 40.7	246 52.7	318 30.5	206 1.7	4	2
29	22 20.0	135 29.4	2 42.3	247 59.6	317 58.7	337 47.5	5	2
Aug. 8	22 20.6	134 56.2	2 43.9	249 6.4	317 26.9	109 33.4	6	3
18	22 21.2	134 23.0	2 45.4	250 13.3	316 55.2	241 19.2	7	3
28	22 21.9	133 49.8	2 47.0	251 20.1	316 23.4	13 5.0	8	4
							9	4
Sept. 7	22 22.5	133 16.6	2 48.5	252 26.9	315 51.6	144 50.9	10	5
17	22 23.1	132 43.4	2 50.1	253 33.8	315 19.8	276 36.7	11	6
27	22 23.7	132 10.2	2 51.6	254 40.6	314 48.1	48 22.6	12	6
Oct. 7	22 24.4	131 37.1	2 53.1	255 47.5	314 16.3	180 8.4	13	7
17	22 25.0	131 4.0	2 54.5	256 54.3	313 44.5	311 54.2	14	7
							15	8
27	22 25.6	130 30.9	2 56.0	258 1.2	313 12.7	83 40.1	16	8
Nov. 6	22 26.3	129 57.8	2 57.4	259 8.0	312 41.0	215 25.9	17	9
16	22 26.9	129 24.7	2 58.9	260 14.8	312 9.2	347 11.7	18	9
26	22 27.6	128 51.6	3 0.3	261 21.7	311 37.4	118 57.6	19	10
Dec. 6	22 28.3	128 18.6	3 1.7	262 28.5	311 5.7	250 43.4	20	10
							21	11
16	22 28.9	127 45.6	3 3.0	263 35.4	310 33.9	22 29.3	22	11
26	22 29.6	127 12.6	3 4.4	264 42.2	310 2.1	154 15.1	23	12
36	22 30.3	126 39.6	3 5.7	265 49.1	309 30.3	286 0.9	24	12

MOON'S LIBRATION. SUN'S ABERRATION AND PARALLAX. 213

QUANTITIES REQUIRED IN COMPUTING THE MOON'S LIBRATION.

ARGUMENT, $(\Omega - \lambda)$, or $(\Omega - \lambda - 180^\circ)$.

$-\lambda$	μ	$\frac{1}{A}$	B	$\Omega - \lambda$
0	0.0	37	0 0.0	180
2	0.0	37	0 3.2	178
4	0.1	37	0 6.4	176
6	0.1	38	0 9.6	174
8	0.2	38	0 12.8	172
10	0.2	38	0 16.0	170
12	0.3	38	0 19.2	168
14	0.3	38	0 22.3	166
16	0.3	39	0 25.4	164
18	0.4	39	0 28.5	162
20	0.4	40	0 31.5	160
22	0.4	40	0 34.5	158
24	0.5	41	0 37.5	156
26	0.5	42	0 40.4	154
28	0.5	42	0 43.2	152
30	0.5	43	0 46.1	150
32	0.6	44	0 48.8	148
34	0.6	45	0 51.5	146
36	0.6	46	0 54.1	144
38	0.6	47	0 56.7	142
40	0.6	49	0 59.2	140
42	0.6	50	1 1.6	138
44	0.6	52	1 4.0	136
46	0.6	54	1 6.3	134
48	0.6	56	1 8.5	132
50	0.6	58	1 10.6	130
52	0.6	61	1 12.6	128
54	0.6	64	1 14.5	126
56	0.6	67	1 16.4	124
58	0.6	70	1 18.1	122
60	0.5	75	1 19.8	120
62	0.5	80	1 21.3	118
64	0.5	85	1 22.8	116
66	0.5	92	1 24.1	114
68	0.4	100	1 25.4	112
70	0.4	109	1 26.5	110
72	0.4	121	1 27.6	108
74	0.3	135	1 28.5	106
76	0.3	154	1 29.4	104
78	0.3	180	1 30.1	102
80	0.2	215	1 30.7	100
82	0.2	268	1 31.2	98
84	0.1	357	1 31.6	96
86	0.1	535	1 31.9	94
88	0.0	1070	1 32.0	92
90	0.0	∞	1 32.1	90

SUN'S ABERRATION AND HORIZONTAL PARALLAX.

FOR GREENWICH MEAN NOON.

Date.	Aberration.	Hor. Par.
1915.	"	"
Jan. 0	-20.81	8.95
10	20.81	8.95
20	20.80	8.94
30	20.77	8.93
Feb. 9	20.74	8.92
19	-20.70	8.90
Mar. 1	20.65	8.88
11	20.60	8.86
21	20.54	8.83
31	20.48	8.81
Apr. 10	-20.42	8.78
20	20.36	8.76
30	20.31	8.73
May 10	20.26	8.71
20	20.22	8.69
30	-20.18	8.68
June 9	20.16	8.67
19	20.14	8.66
29	20.13	8.66
July 9	20.13	8.66
19	-20.14	8.66
29	20.16	8.67
Aug. 8	20.18	8.68
18	20.22	8.69
28	20.26	8.71
Sept. 7	-20.31	8.73
17	20.36	8.76
27	20.42	8.78
Oct. 7	20.48	8.81
17	20.54	8.83
27	-20.59	8.86
Nov. 6	20.65	8.88
16	20.70	8.90
26	20.74	8.92
Dec. 6	20.77	8.93
16	-20.79	8.94
26	20.81	8.95
36	-20.81	8.95

Sun's Mean Equatorial Horizontal Parallax.

8".80; $\log = 0.94448$.

μ has the sign of $\tan (\lambda - \Omega)$
 A has the sign of $\cos (\Omega - \lambda)$
 B has the sign of $\sin (\Omega - \lambda)$
 See formulæ, page xi.

(CONSTANTS OF PARIS CONFERENCE.)

FOR GREENWICH MEAN NOON.

Date.	Precession in Longitude from 1915.0.	Nutation.			Obliquity of Ecliptic. (Newcomb.)	Date.	Precession in Longitude from 1915.0.	Nutation.			Obliquity of Ecliptic. (Newcomb.)
		$\delta' \phi$ In Longitude.	$\delta' a$ In R. A.	$\delta' \omega$ In Obliquity.				$\delta' \phi$ In Longitude.	$\delta' a$ In R. A.	$\delta' \omega$ In Obliquity.	
		"	"	"	$23^{\circ} 27'$			"	"	"	
Jan. 0	- 0.13	+ 9.07	+0.554	+7.33	8.56	July 4	+25.32	+11.51	+0.704	+6.48	
5	+ 0.56	9.35	0.572	7.35	8.57	9	26.01	11.75	0.719	6.50	
10	1.25	9.62	0.588	7.38	8.60	14	26.70	11.96	0.732	6.52	
15	1.94	9.86	0.603	7.43	8.64	19	27.39	12.15	0.743	6.56	
20	2.62	10.07	0.616	7.48	8.69	24	28.08	12.32	0.753	6.60	
25	+ 3.31	+10.25	+0.627	+7.54	8.74	29	+28.76	+12.45	+0.762	+6.65	
30	4.00	10.40	0.636	7.62	8.81	Aug. 3	29.45	12.55	0.768	6.71	
Feb. 4	4.69	10.49	0.642	7.70	8.88	8	30.14	12.62	0.772	6.78	
9	5.38	10.55	0.645	7.77	8.95	13	30.83	12.65	0.774	6.84	
14	6.06	10.57	0.646	7.84	9.01	18	31.52	12.65	0.774	6.90	
19	+ 6.75	+10.55	+0.645	+7.91	9.07	23	+32.20	+12.62	+0.772	+6.96	
24	7.44	10.50	0.642	7.97	9.13	28	32.89	12.56	0.768	7.01	
Mar. 1	8.13	10.41	0.637	8.02	9.17	Sept. 2	33.58	12.46	0.762	7.04	
6	8.82	10.30	0.630	8.04	9.19	7	34.27	12.35	0.755	7.07	
11	9.50	10.17	0.622	8.06	9.21	12	34.95	12.22	0.747	7.08	
16	+10.19	+10.04	+0.613	+8.06	9.19	17	+35.64	+12.07	+0.738	+7.08	
21	10.88	9.88	0.604	8.05	9.17	22	36.33	11.90	0.729	7.06	
26	11.57	9.72	0.595	8.02	9.14	27	37.02	11.75	0.719	7.03	
31	12.25	9.58	0.586	7.98	9.10	Oct. 2	37.71	11.59	0.709	6.98	
Apr. 5	12.94	9.45	0.578	7.91	9.02	7	38.39	11.44	0.700	6.92	
10	+13.63	+ 9.34	+0.571	+7.84	8.94	12	+39.08	+11.31	+0.692	+6.84	
15	14.32	9.24	0.566	7.74	8.84	17	39.77	11.21	0.686	6.75	
20	15.01	9.18	0.562	7.65	8.74	22	40.46	11.12	0.681	6.64	
25	15.69	9.14	0.560	7.54	8.62	27	41.15	11.08	0.678	6.53	
30	16.38	9.14	0.559	7.43	8.50	Nov. 1	41.83	11.06	0.677	6.41	
May 5	+17.07	+ 9.17	+0.561	+7.31	8.38	6	+42.52	+11.09	+0.678	+6.28	
10	17.76	9.24	0.565	7.19	8.26	11	43.21	11.15	0.682	6.16	
15	18.45	9.34	0.571	7.08	8.13	16	43.90	11.26	0.689	6.03	
20	19.13	9.47	0.579	6.97	8.02	21	44.58	11.40	0.698	5.91	
25	19.82	9.63	0.589	6.87	7.91	26	45.27	11.59	0.709	5.80	
30	+20.51	+ 9.82	+0.601	+6.78	7.82	Dec. 1	+45.96	+11.79	+0.722	+5.69	
June 4	21.20	10.03	0.614	6.69	7.72	6	46.65	12.03	0.736	5.60	
9	21.88	10.26	0.628	6.63	7.65	11	47.34	12.29	0.752	5.52	
14	22.57	10.50	0.643	6.57	7.59	16	48.02	12.57	0.769	5.46	
19	23.26	10.76	0.658	6.52	7.53	21	48.71	12.86	0.786	5.41	
24	+23.95	+11.02	+0.673	+6.49	7.49	26	+49.40	+13.15	+0.804	+5.39	
29	24.64	11.27	0.689	6.48	7.48	31	50.09	13.43	0.822	5.38	
July 4	+25.32	+11.51	+0.704	+6.48	7.47	36	+50.77	+13.71	+0.839	+5.39	

Precession for 1915.0 . . . 50.2597 log=1.701220
 Precession in a Solar day . . 0.13761 log=9.13865
 Precession in a Sidereal day 0.13723 log=9.13745
 The short period terms of the Nutation are given
 for Washington midnight on pp. 231-232.

Mean Obliquity, 1915.0.
 Newcomb 23 2
 Hansen 23 2
 Le Verrier 23 2
 Peters 23 2

PART II.

ASTRONOMICAL EPHEMERIS FOR THE MERIDIAN OF WASHINGTON.

216 FORMULÆ FOR THE REDUCTION OF STARS, 1915.

The constants of precession, nutation and aberration adopted by the *Conférence Internationale des Étoiles Fondamentales* which met in Paris in May, 1896, are given on page xiv, and together with the notation of BESSEL, are used in the formulæ which follow.

BESSELIAN STAR-NUMBERS.

<i>Terms of Long Period.</i>	<i>Terms of Short Period.</i>
$A = \tau - 0.342\ 20 \sin \Omega$	$-0.004\ 05 \sin 2 \zeta$
$+ 0.004\ 15 \sin 2 \Omega$	$+0.000\ 23 \sin (\zeta + \Gamma')$
$- 0.025\ 26 \sin 2 L$	$+0.001\ 34 \sin (\zeta - \Gamma')$
$+ 0.002\ 51 \sin (L - \Gamma)$	$-0.000\ 68 \sin (2 \zeta - \Omega)$
$- 0.000\ 99 \sin (3 L - \Gamma)$	$-0.000\ 52 \sin (3 \zeta - \Gamma')$
$+ 0.000\ 42 \sin (L + \Gamma)$	$+0.000\ 30 \sin (\zeta - 2 L + \Gamma')$
$+ 0.000\ 25 \sin (2 L - \Omega)$	$+0.000\ 12 \sin 2 (\zeta - L)$
"	"
$B = - 9.210 \cos \Omega$	$-0.088 \cos 2 \zeta$
$+ 0.090 \cos 2 \Omega$	$-0.018 \cos (2 \zeta - \Omega)$
$- 0.552 \cos 2 L$	$-0.011 \cos (3 \zeta - \Gamma')$
$- 0.022 \cos (3 L - \Gamma)$	$+0.005 \cos (\zeta + \Gamma')$
$+ 0.009 \cos (L + \Gamma)$	
$+ 0.007 \cos (2 L - \Omega)$	
$C = -20.4700 \cos \omega \cos \odot$	
$D = -20.4700 \sin \odot$	
$E = - 0.0417 \sin \Omega + 0''.0005 \sin 2 \Omega - 0''.0031 \sin 2 L$	

BESSEL'S Star-Constants.

$a = 3''.072\ 62 + 1''.336\ 38 \sin \alpha_0 \tan \delta_0$	$a' = 20''.0455 \cos \alpha_0$
$b = \frac{1}{3} \cos \alpha_0 \tan \delta_0$	$b' = -\sin \alpha_0$
$c = \frac{1}{3} \cos \alpha_0 \sec \delta_0$	$c' = \tan \omega \cos \delta_0 - \sin \alpha_0 \sin \delta_0$
$d = \frac{1}{3} \sin \alpha_0 \sec \delta_0$	$d' = \cos \alpha_0 \sin \delta_0$

Formulæ for Reduction to Apparent Position.

$$\begin{aligned} * \alpha &= \alpha_0 + \tau \mu + Aa + Bb + Cc + Dd + \frac{1}{3}E & (\text{in time}) \\ \delta &= \delta_0 + \tau \mu' + Aa' + Bb' + Cc' + Dd' & (\text{in arc}) \end{aligned}$$

INDEPENDENT STAR-NUMBERS.

$$\begin{aligned} f + f' &= +46''.0892 A + E \text{ (in arc)} = 3''.072\ 62 A + \frac{1}{3}E & (\text{in time}) \\ f' &= - 0''.0124 \sin 2 \zeta + 0''.0041 \sin (\zeta - \Gamma') + 0''.0007 \sin (\zeta + \Gamma') \\ &\quad - 0''.0021 \sin (2 \zeta - \Omega) - 0''.0016 \sin (3 \zeta - \Gamma') \\ &\quad + 0''.0009 \sin (\zeta - 2 L + \Gamma') + 0''.0004 \sin 2 (\zeta - L) \\ g \sin G &= B & h \sin H &= C & i &= C \tan \omega \\ g \cos G &= 20''.0455 A & h \cos H &= D \end{aligned}$$

Formulæ for Reduction to Apparent Position.

$$\begin{aligned} * \alpha &= \alpha_0 + f + f' + \tau \mu + \frac{1}{3}g \sin (G + \alpha_0) \tan \delta_0 + \frac{1}{3}h \sin (H + \alpha_0) \sec \delta_0 & (\text{in time}) \\ \delta &= \delta_0 + \tau \mu' + g \cos (G + \alpha_0) + h \cos (H + \alpha_0) \sin \delta_0 + i \cos \delta_0 & (\text{in arc}) \end{aligned}$$

In the above formulæ,

τ denotes the time reckoned in units of one year, from the beginning of the Besselian fictitious year (1915, January 0^d.732, Washington mean time),
 α_0, δ_0 , the star's mean R. A. and Decl. at the beginning of the fictitious year,
 α, δ , the star's apparent right ascension and declination at the time τ ,
 μ, μ' , the annual proper motion in right ascension and declination,

\odot , the Sun's true longitude,	ω , the obliquity of the ecliptic,
L , the Sun's mean longitude,	Γ , the long. of the Sun's perigee,
Ω , the longitude of the Moon's ascending node,	Γ' , the long. of the Moon's perigee,
	ζ , the Moon's mean longitude.

* See page 217 for statement concerning the use of these formulæ.

The independent star-numbers are more convenient than BESSEL'S, when only one or two apparent positions of a star are required, or when BESSEL'S star-constants are not known with sufficient accuracy.

In using the star-constants of the *British Association Catalogue*, $a, b, c, d, a', b', c', d'$, with the star-numbers of this Ephemeris, the quantities to be computed are $Ac, Bd, Ca, Db, -Ac', -Bd', -Ca', -Db'$.

In the computation of the independent star-numbers given for Washington mean midnight of each day of the year, on pages 222-229, the short-period terms—that is, the terms involving the Moon's mean longitude—have been included in the two columns headed G and $\text{Log } g$. The quantities f and f' correspond to f' and f'' , respectively, as given on the page of constants in Part IV of the American Ephemeris for the years 1901 to 1911, inclusive, and are tabulated in the third and fourth columns, respectively, giving separately the effect of the long-period and short-period terms. f' differs but slightly from the term $-o''.1866 \sin 2\zeta + o''.0622 \sin (\zeta - \Gamma')$ given on page 37 of the *Procès-Verbaux* of the Paris Conference, and also on page 289 of the American Ephemeris and Nautical Almanac for 1900. In computing the reduction of stars from mean to apparent place, or vice versa, using the independent star-numbers, the quantity f' (which is the same for all stars) should be omitted in using the formulæ for α on page 216, in case it is desired to make the reduction in conformity with the decision of the Paris Conference with reference to this matter. See page of *Procès-Verbaux* above cited.

In the computation of the Besselian star-numbers, pages 218-221, all short-period terms have been included, and hence in using these quantities in the reduction of stars to apparent place by means of the formulæ for that purpose on page 216, f' must be subtracted from the final result if it is desired, in compliance with the decision of the Paris Conference, to omit that quantity.

In computing the ephemerides of the circumpolar stars in this volume, all short-period terms have been included, excepting the quantity f' above mentioned, which has been omitted.

In the computation of the ephemerides of the ten-day stars, no short-period terms have been included. These terms attain two maxima and two minima during the tropical month. At maximum and minimum they may amount in right ascension to $\pm o''.008 \tan \delta$, and in declination to $\pm o''.13$. For computing the effect of these terms for the correction of the positions of stars interpolated from the ten-day ephemerides, the following formulæ may be used, in which $\Delta\alpha$ and $\Delta\delta$ denote the effect of the short-period terms in right ascension and declination, respectively, and $\delta''\psi$ and $\delta''\omega$, the sum of the short-period terms of the nutation in longitude and obliquity:

$$\begin{aligned}\Delta\alpha &= D'\psi\alpha\delta''\psi + D_\omega\alpha\delta''\omega \\ \Delta\delta &= D_\phi\delta\delta''\psi + D_\omega\delta\delta''\omega\end{aligned}$$

The values of $\delta''\psi$ and of $\delta''\omega$ for Washington mean midnight are given for each day of the year on pages 231-232, and have been computed as follows:

$$\delta''\psi = 50''.37 A_2, \quad \delta''\omega = -B_2$$

in which A_2 and B_2 are the sums of the short-period terms given in the expressions for A and B on page 216.

The quantities $D'\psi\alpha$, $D_\omega\alpha$, $D_\phi\delta$, and $D_\omega\delta$ are given for each ten-day star on pages 287-486, and have been computed by means of the following formulæ:

$$\begin{aligned}D'\psi\alpha &= \frac{1}{18} \sin \alpha \tan \delta \sin \omega & D_\omega\alpha &= -\frac{1}{18} \cos \alpha \tan \delta \\ D_\phi\delta &= \cos \alpha \sin \omega & D_\omega\delta &= \sin \alpha\end{aligned}$$

The complete derivative of the right ascension with reference to ψ is

$$D_\psi\alpha = \frac{1}{18} (\cos \omega + \sin \alpha \tan \delta \sin \omega)$$

and the omission of the term $\frac{1}{18} \cos \omega$ is made in accordance with the above-mentioned decision of the Paris Conference with reference to the quantity f' .

FOR WASHINGTON MEAN MIDNIGHT.

Solar Day. (Sid. Hr.)	Log A.	Log B.	Log C.	Log D.	Solar Day. (Sid. Hr.)	Log A.	Log B.	Log C.
Jan. 0	+9.25629	-0.8594	-0.50104	+1.30484	Feb. 15	+9.52795	-0.9012	-1.19460
1	9.26940	0.8608	0.54388	1.30345	16	9.52862	0.9019	1.19958
2	9.28096	0.8632	0.58276	1.30191	17	9.52953	0.9015	1.20436
3	9.29041	0.8662	0.61831	1.30023	18	9.53104	0.9004	1.20896
h (7.0) 4	9.29758	0.8692	0.65104	1.29841	h (10.0) 19	9.53335	0.8989	1.21337
5	+9.30272	-0.8716	-0.68135	+1.29644	20	+9.53653	-0.8973	-1.21761
6	9.30651	0.8728	0.70956	1.29432	21	9.54050	0.8961	1.22167
7	9.30999	0.8726	0.73591	1.29206	22	9.54512	0.8954	1.22555
8	9.31440	0.8711	0.76063	1.28964	23	9.55015	0.8956	1.22927
9	9.32069	0.8687	0.78390	1.28708	24	9.55521	0.8968	1.23282
10	+9.32927	-0.8660	-0.80583	+1.28436	25	+9.55991	-0.8988	-1.23620
11	9.33991	0.8639	0.82659	1.28148	26	9.56380	0.9016	1.23943
12	9.35182	0.8629	0.84627	1.27845	27	9.56672	0.9046	1.24250
13	9.36391	0.8635	0.86496	1.27525	28	9.56853	0.9074	1.24541
14	9.37501	0.8656	0.88275	1.27190	Mar. 1	9.56939	0.9093	1.24817
15	+9.38430	-0.8687	-0.89970	+1.26838	2	+9.56974	-0.9101	-1.25078
16	9.39144	0.8723	0.91589	1.26469	3	9.57015	0.9095	1.25324
17	9.39653	0.8756	0.93135	1.26084	4	9.57122	0.9078	1.25555
18	9.40005	0.8781	0.94615	1.25681	5	9.57344	0.9053	1.25772
19	9.40266	0.8796	0.96032	1.25261	h (11.0) 6	9.57699	0.9028	1.25974
h (8.0) 20	+9.40504	-0.8798	-0.97392	+1.24823	7	+9.58164	-0.9009	-1.26162
21	9.40783	0.8793	0.98696	1.24366	8	9.58694	0.9002	1.26337
22	9.41150	0.8780	0.99948	1.23891	9	9.59217	0.9009	1.26497
23	9.41627	0.8764	1.01152	1.23398	10	9.59679	0.9028	1.26643
24	9.42215	0.8749	1.02310	1.22884	11	9.60029	0.9054	1.26776
25	+9.42901	-0.8739	-1.03424	+1.22351	12	+9.60257	-0.9082	-1.26895
26	9.43659	0.8736	1.04496	1.21798	13	9.60370	0.9104	1.27000
27	9.44444	0.8743	1.05529	1.21224	14	9.60404	0.9118	1.27092
28	9.45211	0.8761	1.06525	1.20628	15	9.60408	0.9121	1.27171
29	9.45909	0.8788	1.07484	1.20011	16	9.60419	0.9113	1.27237
30	+9.46488	-0.8822	-1.08409	+1.19371	17	+9.60473	-0.9096	-1.27289
31	9.46922	0.8857	1.09301	1.18708	18	9.60599	0.9074	1.27328
Feb. 1	9.47214	0.8888	1.10162	1.18021	19	9.60801	0.9050	1.27354
2	9.47395	0.8909	1.10992	1.17309	20	9.61076	0.9028	1.27367
3	9.47529	0.8917	1.11793	1.16572	h (12.0) 21	9.61413	0.9011	1.27366
h (9.0) 4	+9.47697	-0.8911	-1.12566	+1.15808	22	+9.61791	-0.9001	-1.27353
5	9.47969	0.8895	1.13312	1.15017	23	9.62183	0.9001	1.27327
6	9.48391	0.8873	1.14032	1.14197	24	9.62556	0.9009	1.27287
7	9.48972	0.8854	1.14727	1.13349	25	9.62885	0.9026	1.27235
8	9.49673	0.8844	1.15397	1.12469	26	9.63134	0.9046	1.27170
9	+9.50423	-0.8848	-1.16043	+1.11558	27	+9.63297	-0.9065	-1.27092
10	9.51135	0.8866	1.16667	1.10614	28	9.63377	0.9079	1.27000
11	9.51739	0.8895	1.17268	1.09635	29	9.63400	0.9081	1.26896
12	9.52199	0.8931	1.17847	1.08621	30	9.63421	0.9070	1.26778
13	9.52509	0.8965	1.18405	1.07569	31	9.63487	0.9047	1.26648
14	+9.52691	-0.8993	-1.18943	+1.06477	Apr. 1	+9.63644	-0.9014	-1.26504
15	+9.52795	-0.9012	-1.19460	+1.05343	2	+9.63917	-0.8979	-1.26346

$$R = +0''.02 = +0''.002$$

[Eph 15]

FOR WASHINGTON MEAN MIDNIGHT.

Day. Hr.)	Log A.	Log B.	Log C.	Log D.	Solar Day. (Sid. Hr.)	Log A.	Log B.	Log C.	Log D.
1	+9.63644	-0.9014	-1.26504	-0.60679	May 17	+9.74970	-0.8411	-1.01905	-1.23069
2	9.63917	0.8979	1.26346	0.64231	18	9.75318	0.8415	1.00794	1.23549
3	9.64296	0.8947	1.26176	0.67500	19	9.75618	0.8427	0.99643	1.24011
4	9.64744	0.8926	1.25992	0.70526	20	9.75858	0.8442	0.98448	1.24456
5	9.65216	0.8919	1.25794	0.73343	h 21	9.76038	0.8454	0.97207	1.24884
h 6	+9.65644	-0.8924	-1.25583	-0.75974	(18.0) 22	+9.76163	-0.8458	-0.95918	-1.25296
(18.0) 7	9.65993	0.8940	1.25358	0.78441	23	9.76265	0.8449	0.94577	1.25692
8	9.66233	0.8959	1.25118	0.80764	24	9.76374	0.8426	0.93182	1.26072
9	9.66368	0.8975	1.24865	0.82954	25	9.76535	0.8390	0.91728	1.26436
10	9.66428	0.8984	1.24598	0.85026	26	9.76777	0.8345	0.90212	1.26785
11	+9.66445	-0.8981	-1.24317	-0.86991	27	+9.77106	-0.8301	-0.88629	-1.27119
12	9.66467	0.8966	1.24021	0.88857	28	9.77511	0.8263	0.86974	1.27438
13	9.66520	0.8942	1.23710	0.90634	29	9.77960	0.8241	0.85242	1.27743
14	9.66632	0.8911	1.23384	0.92327	30	9.78409	0.8236	0.83426	1.28034
15	9.66817	0.8878	1.23044	0.93944	31	9.78816	0.8246	0.81518	1.28310
16	+9.67066	-0.8845	-1.22688	-0.95489	June 1	+9.79148	-0.8266	-0.79510	-1.28573
17	9.67373	0.8816	1.22316	0.96969	2	9.79399	0.8288	0.77392	1.28821
18	9.67728	0.8796	1.21929	0.98386	3	9.79574	0.8304	0.75154	1.29057
19	9.68097	0.8784	1.21526	0.99746	4	9.79696	0.8311	0.72781	1.29279
20	9.68462	0.8782	1.21107	1.01051	h 5	9.79795	0.8304	0.70259	1.29488
h 21	+9.68793	-0.8788	-1.20671	-1.02306	(17.0) 6	+9.79904	-0.8284	-0.67569	-1.29683
(18.0) 22	9.69066	0.8801	1.20218	1.03512	7	9.80045	0.8255	0.64689	1.29866
23	9.69263	0.8815	1.19748	1.04672	8	9.80233	0.8220	0.61592	1.30036
24	9.69392	0.8824	1.19261	1.05790	9	9.80474	0.8185	0.58245	1.30193
25	9.69467	0.8824	1.18756	1.06866	10	9.80759	0.8153	0.54606	1.30337
26	+9.69529	-0.8810	-1.18232	-1.07904	11	+9.81083	-0.8129	-0.50621	-1.30469
27	9.69614	0.8782	1.17690	1.08905	12	9.81430	0.8115	0.46220	1.30588
28	9.69772	0.8744	1.17128	1.09870	13	9.81778	0.8113	0.41311	1.30695
29	9.70029	0.8700	1.16547	1.10802	14	9.82113	0.8122	0.35762	1.30790
30	9.70386	0.8658	1.15945	1.11701	15	9.82412	0.8140	0.29387	1.30872
July 1	+9.70821	-0.8626	-1.15323	-1.12570	16	+9.82659	-0.8164	-0.21900	-1.30943
2	9.71288	0.8607	1.14679	1.13409	17	9.82851	0.8187	0.12834	1.31001
3	9.71736	0.8603	1.14013	1.14220	18	9.82994	0.8203	0.01351	1.31046
4	9.72127	0.8612	1.13325	1.15003	19	9.83100	0.8207	9.85681	1.31080
5	9.72423	0.8628	1.12613	1.15760	20	9.83207	0.8197	9.60912	1.31102
h 6	+9.72626	-0.8643	-1.11877	-1.16491	h 21	+9.83341	-0.8171	-8.97280	-1.31111
(18.0) 7	9.72750	0.8651	1.11116	1.17198	(18.0) 22	9.83535	0.8136	+9.33976	1.31109
8	9.72828	0.8648	1.10329	1.17881	23	9.83805	0.8098	9.72521	1.31095
9	9.72893	0.8633	1.09516	1.18541	24	9.84144	0.8066	9.92604	1.31068
10	9.72981	0.8607	1.08674	1.19179	25	9.84532	0.8046	0.06273	1.31030
11	+9.73117	-0.8572	-1.07804	-1.19795	26	+9.84934	-0.8045	+0.16645	-1.30979
12	9.73312	0.8533	1.06904	1.20390	27	9.85312	0.8061	0.25000	1.30916
13	9.73570	0.8495	1.05972	1.20964	28	9.85636	0.8089	0.31994	1.30842
14	9.73879	0.8460	1.05008	1.21519	29	9.85885	0.8122	0.38005	1.30755
15	9.74230	0.8434	1.04010	1.22054	30	9.86068	0.8153	0.43274	1.30655
16	+9.74601	-0.8417	-1.02976	-1.22571	July 1	+9.86196	-0.8173	+0.47963	-1.30544
17	+9.74970	-0.8411	-1.01905	-1.23069	2	+9.86292	-0.8181	+0.52183	-1.30420

$$R = +0''.02 = +0''.008$$

[Rph 15]

FOR WASHINGTON MEAN MIDNIGHT.

Solar Day. (Sid. Hr.)	Log A.	Log B.	Log C.	Log D.	Solar Day. (Sid. Hr.)	Log A.	Log B.	Log C.	Log D.
July 1	+0.86196	-0.8173	+0.47963	-1.30544	Aug. 16	+9.93928	-0.8373	+1.17729	-1.08834
2	9.86292	0.8181	0.52183	1.30420	17	9.94098	0.8349	1.18265	1.07842
3	9.86385	0.8175	0.56018	1.30284	18	9.94320	0.8332	1.18782	1.06813
4	9.86500	0.8157	0.59531	1.30135	19	9.94570	0.8329	1.19281	1.05746
5	9.86650	0.8133	0.62770	1.29974	20	9.94828	0.8342	1.19762	1.04640
h 6	+9.86847	-0.8107	+0.65774	-1.29800	h 21	+9.95057	-0.8369	+1.20226	-1.03492
(19.0) 7	9.87080	0.8083	0.68572	1.29613	(23.0) 22	9.95237	0.8406	1.20673	1.02360
8	9.87348	0.8067	0.71189	1.29414	23	9.95359	0.8444	1.21104	1.01061
9	9.87637	0.8060	0.73647	1.29201	24	9.95432	0.8477	1.21518	0.99772
10	9.87934	0.8064	0.75961	1.28975	25	9.95466	0.8498	1.21917	0.98431
11	+9.88220	-0.8081	+0.78147	-1.28736	26	+9.95484	-0.8505	+1.22300	-0.97033
12	9.88483	0.8107	0.80217	1.28483	27	9.95508	0.8500	1.22667	0.95576
13	9.88703	0.8139	0.82182	1.28217	28	9.95555	0.8485	1.23019	0.94054
14	9.88875	0.8173	0.84050	1.27937	29	9.95634	0.8464	1.23357	0.92463
15	9.88999	0.8201	0.85830	1.27643	30	9.95748	0.8444	1.23679	0.90799
16	+9.89088	-0.8219	+0.87528	-1.27335	31	+9.95892	-0.8427	+1.23988	-0.89054
17	9.89162	0.8222	0.89150	1.27012	Sept. 1	9.96059	0.8418	1.24282	0.87222
18	9.89247	0.8212	0.90703	1.26675	2	9.96238	0.8417	1.24561	0.85295
19	9.89375	0.8189	0.92190	1.26324	3	9.96418	0.8427	1.24827	0.83265
20	9.89565	0.8160	0.93617	1.25957	4	9.96584	0.8446	1.25079	0.81121
h 21	+9.89818	-0.8134	+0.94986	-1.25574	h 5	+9.96728	-0.8472	+1.25317	-0.78851
(20.0) 22	9.90120	0.8120	0.96302	1.25177	(23.0) 6	9.96838	0.8501	1.25542	0.76441
23	9.90448	0.8121	0.97568	1.24763	7	9.96908	0.8529	1.25753	0.73875
24	9.90764	0.8139	0.98787	1.24333	8	9.96945	0.8550	1.25951	0.71133
25	9.91041	0.8172	0.99960	1.23887	9	9.96957	0.8559	1.26136	0.68191
26	+9.91262	-0.8212	+1.01092	-1.23423	10	+9.96965	-0.8555	+1.26308	-0.65021
27	9.91417	0.8252	1.02183	1.22943	11	9.96994	0.8537	1.26466	0.61585
28	9.91520	0.8282	1.03235	1.22444	12	9.97060	0.8509	1.26611	0.57838
29	9.91588	0.8301	1.04252	1.21928	13	9.97178	0.8478	1.26744	0.53722
30	9.91644	0.8306	1.05233	1.21393	14	9.97347	0.8451	1.26864	0.49158
31	+9.91713	-0.8299	+1.06182	-1.20839	15	+9.97551	-0.8436	+1.26971	-0.44041
Aug. 1	9.91810	0.8283	1.07098	1.20265	16	9.97764	0.8436	1.27065	0.38222
2	9.91942	0.8264	1.07984	1.19671	17	9.97964	0.8451	1.27146	0.31484
3	9.92112	0.8246	1.08841	1.19056	18	9.98128	0.8477	1.27215	0.23485
4	9.92313	0.8233	1.09669	1.18420	19	9.98236	0.8506	1.27271	0.13651
h 5	+9.92535	-0.8229	+1.10470	-1.17762	h 20	+9.98295	-0.8533	+1.27314	-0.00896
(21.0) 6	9.92767	0.8236	1.11246	1.17081	(0.0) 21	9.98316	0.8549	1.27345	9.82733
7	9.92996	0.8253	1.11995	1.16377	22	9.98315	0.8552	1.27363	-9.50850
8	9.93207	0.8280	1.12721	1.15648	23	9.98316	0.8542	1.27368	+8.43650
9	9.93384	0.8313	1.13423	1.14895	24	9.98337	0.8520	1.27361	9.57658
10	+9.93521	-0.8349	+1.14102	-1.14115	25	+9.98388	-0.8492	+1.27341	+9.86165
11	9.93614	0.8382	1.14758	1.13309	26	9.98474	0.8461	1.27308	0.03229
12	9.93670	0.8406	1.15393	1.12475	27	9.98592	0.8433	1.27262	0.15444
13	9.93707	0.8417	1.16007	1.11611	28	9.98732	0.8411	1.27204	0.24963
14	9.93746	0.8414	1.16601	1.10717	29	9.98889	0.8398	1.27132	0.32759
15	+9.93811	-0.8397	+1.17175	-1.09792	30	+9.99048	-0.8395	+1.27048	+0.39360
16	+9.93928	-0.8373	+1.17729	-1.08834	Oct. 1	+9.99202	-0.8401	+1.26951	+0.45080

E = +0".03 = +0".002

[Eph 15]

FOR WASHINGTON MEAN MIDNIGHT.

Solar Day. (Sid. Hr.)	Log A.	Log B.	Log C.	Log D.	Solar Day. (Sid. Hr.)	Log A.	Log B.	Log C.	Log D.
Oct. 1	+9.99202	-0.8401	+1.26951	+0.45080	Nov. 16	+0.04130	-0.7868	+1.04521	+1.21784
2	9.99334	0.8415	1.26840	0.50126	17	0.04178	0.7836	1.03458	1.22334
3	9.99441	0.8434	1.26717	0.54638	18	0.04250	0.7794	1.02354	1.22864
4	9.99514	0.8452	1.26580	0.58715	19	0.04351	0.7746	1.01207	1.23374
5	9.99555	0.8465	1.26429	0.62433	20	0.04487	0.7697	1.00015	1.23865
m (1.0) 6	+9.99572	-0.8468	+1.26265	+0.65847	h (4.0) 21	+0.04650	-0.7655	+0.98774	+1.24337
7	9.99581	0.8458	1.26088	0.69003	22	0.04828	0.7622	0.97483	1.24792
8	9.99603	0.8433	1.25896	0.71934	23	0.05017	0.7601	0.96138	1.25228
9	9.99657	0.8397	1.25691	0.74669	24	0.05205	0.7592	0.94735	1.25647
10	9.99757	0.8355	1.25471	0.77231	25	0.05382	0.7595	0.93270	1.26048
11	+9.99909	-0.8314	+1.25238	+0.79640	26	+0.05538	-0.7606	+0.91740	+1.26433
12	0.00100	0.8283	1.24990	0.81910	27	0.05668	0.7622	0.90139	1.26801
13	0.00312	0.8266	1.24727	0.84057	28	0.05770	0.7635	0.88462	1.27152
14	0.00514	0.8266	1.24449	0.86091	29	0.05847	0.7641	0.86703	1.27488
15	0.00690	0.8279	1.24157	0.88022	30	0.05908	0.7634	0.84855	1.27807
16	+0.00819	-0.8299	+1.23849	+0.89860	Dec. 1	+0.05970	-0.7612	+0.82910	+1.28111
17	0.00900	0.8318	1.23526	0.91611	2	0.06051	0.7573	0.80858	1.28399
18	0.00937	0.8329	1.23187	0.93283	3	0.06166	0.7524	0.78689	1.28672
19	0.00954	0.8326	1.22832	0.94881	4	0.06324	0.7471	0.76391	1.28930
h (2.0) 20	0.00964	0.8310	1.22460	0.96410	h (5.0) 5	0.06525	0.7424	0.73949	1.29173
21	+0.00989	-0.8280	+1.22072	+0.97876	6	+0.06756	-0.7391	+0.71347	+1.29400
22	0.01042	0.8241	1.21667	0.99282	7	0.07000	0.7379	0.68563	1.29614
23	0.01130	0.8199	1.21245	1.00631	8	0.07229	0.7387	0.65574	1.29812
24	0.01250	0.8158	1.20806	1.01928	9	0.07427	0.7409	0.62348	1.29966
25	0.01397	0.8122	1.20348	1.03176	10	0.07581	0.7438	0.58847	1.30166
26	+0.01560	-0.8096	+1.19872	+1.04376	11	+0.07693	-0.7463	+0.55024	+1.30322
27	0.01730	0.8080	1.19376	1.05532	12	0.07773	0.7476	0.50815	1.30463
28	0.01898	0.8074	1.18862	1.06646	13	0.07834	0.7474	0.46139	1.30590
29	0.02050	0.8078	1.18328	1.07720	14	0.07896	0.7454	0.40882	1.30703
30	0.02178	0.8088	1.17773	1.08755	15	0.07975	0.7421	0.34882	1.30803
31	+0.02278	-0.8100	+1.17197	+1.09754	16	+0.08081	-0.7380	+0.27903	+1.30888
Nov. 1	0.02348	0.8109	1.16600	1.10718	17	0.08214	0.7337	0.19565	1.30960
2	0.02393	0.8108	1.15981	1.11649	18	0.08373	0.7301	0.09217	1.31018
3	0.02428	0.8094	1.15339	1.12548	19	0.08552	0.7273	0.95586	1.31062
4	0.02470	0.8065	1.14673	1.13416	20	0.08741	0.7259	9.75584	1.31092
h (3.0) 5	+0.02538	-0.8022	+1.13983	+1.14255	h (6.0) 21	+0.08929	-0.7258	+9.37345	+1.31108
6	0.02647	0.7971	1.13269	1.15065	22	0.09110	0.7271	-8.98868	1.31111
7	0.02806	0.7919	1.12528	1.15847	23	0.09270	0.7294	9.63466	1.31100
8	0.03005	0.7874	1.11760	1.16603	24	0.09410	0.7322	9.88358	1.31076
9	0.03233	0.7845	1.10965	1.17333	25	0.09522	0.7351	0.04073	1.31037
10	+0.03461	-0.7833	+1.10141	+1.18038	26	+0.09610	-0.7374	-0.15580	+1.30985
11	0.03670	0.7838	1.09286	1.18719	27	0.09675	0.7385	0.24657	1.30919
12	0.03837	0.7854	1.08401	1.19376	28	0.09737	0.7380	0.32150	1.30840
13	0.03960	0.7873	1.07483	1.20011	29	0.09808	0.7360	0.38528	1.30746
14	0.04041	0.7885	1.06532	1.20624	30	0.09905	0.7325	0.44077	1.30638
15	+0.04089	-0.7884	+1.05545	+1.21215	31	+0.10039	-0.7284	-0.48985	+1.30516
16	+0.04130	-0.7868	+1.04521	+1.21784	32	+0.10212	-0.7247	-0.53382	+1.30380

$$R = +0''.03 = +0''.003$$

[Eph 15]

FOR WASHINGTON MEAN MIDNIGHT.

Solar Day. (Sidereal Hour.)	τ	f		f'		G		H		Log g .	Log h .	i
		In Time.		In Time.		In Arc.	In Time.	In Arc.	In Time.			
		y	s	s		$^{\circ}$ $'$	h m	$^{\circ}$ $'$	h m			$''$
Jan.	0	-0.0006	+0.554	+0.001		296 33.8	19 46.3	351 4.3	23 24.3	0.90782	1.31013	-1.38
	1	+0.0021	0.567	0.006		297 11.0	19 48.7	350 7.9	23 20.5	0.91166	1.30992	1.52
	2	0.0048	0.578	0.010		297 40.7	19 50.7	349 11.5	23 16.8	0.91600	1.30969	1.66
	3	0.0076	0.590	0.011		298 1.8	19 52.1	348 15.0	23 13.0	0.92043	1.30943	1.80
h	4	0.0103	0.602	0.009		298 15.4	19 53.0	347 18.4	23 9.2	0.92433	1.30916	1.94
(7.0)	5	0.0130	+0.614	+0.004		298 24.6	19 53.6	346 21.8	23 5.5	0.92732	1.30886	-2.08
	6	0.0158	0.626	-0.002		298 33.1	19 54.2	345 25.0	23 1.7	0.92914	1.30854	2.22
	7	0.0185	0.638	0.009		298 45.4	19 55.0	344 28.2	22 57.9	0.92980	1.30821	2.36
	8	0.0213	0.649	0.014		299 5.3	19 56.4	343 31.3	22 54.1	0.92968	1.30786	2.50
	9	0.0240	0.661	0.016		299 34.4	19 58.3	342 34.3	22 50.3	0.92933	1.30749	2.64
	10	0.0267	+0.672	-0.015		300 13.1	20 0.9	341 37.2	22 46.5	0.92947	1.30710	-2.77
	11	0.0295	0.684	0.010		300 57.5	20 3.8	340 40.0	22 42.7	0.93062	1.30669	-2.91
	12	0.0322	0.695	-0.003		301 42.7	20 6.8	339 42.7	22 38.8	0.93315	1.30626	3.04
	13	0.0350	0.706	+0.005		302 23.8	20 9.6	338 45.3	22 35.0	0.93698	1.30581	3.18
	14	0.0377	0.718	0.012		302 56.0	20 11.7	337 47.7	22 31.2	0.94167	1.30535	3.31
	15	0.0404	+0.729	+0.017		303 18.5	20 13.2	336 50.1	22 27.3	0.94663	1.30488	-3.44
	16	0.0432	0.740	0.018		303 31.3	20 14.1	335 52.3	22 23.5	0.95131	1.30439	3.57
	17	0.0459	0.751	0.016		303 38.1	20 14.5	334 54.4	22 19.6	0.95512	1.30389	3.70
	18	0.0486	0.762	0.011		303 41.7	20 14.8	333 56.4	22 15.8	0.95796	1.30337	3.83
	19	0.0514	0.773	+0.005		303 45.8	20 15.1	332 58.3	22 11.9	0.95977	1.30284	3.96
h	20	0.0541	+0.784	-0.002		303 53.3	20 15.6	331 59.9	22 8.0	0.96076	1.30230	-4.08
(8.0)	21	0.0569	0.795	0.007		304 5.8	20 16.4	331 1.5	22 4.1	0.96120	1.30174	4.21
	22	0.0596	0.805	0.011		304 24.1	20 17.6	330 3.0	22 0.2	0.96148	1.30117	4.33
	23	0.0623	0.816	0.013		304 47.6	20 19.2	329 4.3	21 56.3	0.96195	1.30059	4.45
	24	0.0651	0.826	0.012		305 15.0	20 21.0	328 5.4	21 52.4	0.96289	1.30000	4.57
	25	0.0678	+0.836	-0.010		305 44.6	20 23.0	327 6.5	21 48.4	0.96450	1.29939	-4.69
	26	0.0706	0.847	-0.006		306 14.2	20 24.9	326 7.4	21 44.5	0.96694	1.29878	4.81
	27	0.0733	0.857	0.000		306 41.1	20 26.7	325 8.1	21 40.5	0.97018	1.29816	4.93
	28	0.0760	0.867	+0.005		307 3.5	20 28.2	324 8.6	21 36.6	0.97407	1.29754	5.04
	29	0.0788	0.877	0.009		307 19.7	20 29.3	323 9.1	21 32.6	0.97836	1.29690	5.15
	30	0.0815	+0.887	+0.011		307 29.0	20 29.9	322 9.3	21 28.6	0.98263	1.29626	-5.26
	31	0.0842	0.897	0.010		307 32.1	20 30.1	321 9.4	21 24.6	0.98645	1.29562	5.37
Feb.	1	0.0870	0.906	0.007		307 31.5	20 30.1	320 9.4	21 20.6	0.98947	1.29496	5.48
	2	0.0897	0.916	+0.001		307 30.3	20 30.0	319 9.1	21 16.6	0.99146	1.29431	5.59
	3	0.0924	0.925	-0.006		307 32.6	20 30.2	318 8.8	21 12.6	0.99246	1.29365	5.69
h	4	0.0952	+0.935	-0.012		307 41.1	20 30.7	317 8.2	21 8.5	0.99272	1.29299	-5.79
(9.0)	5	0.0979	0.944	0.015		307 57.8	20 31.9	316 7.5	21 4.5	0.99271	1.29232	5.89
	6	0.1007	0.953	0.015		308 22.3	20 33.5	315 6.5	21 0.4	0.99301	1.29167	5.99
	7	0.1034	0.962	0.012		308 52.2	20 35.5	314 5.5	20 56.4	0.99412	1.29101	6.09
	8	0.1061	0.971	-0.005		309 23.1	20 37.5	313 4.2	20 52.3	0.99631	1.29034	6.18
	9	0.1089	+0.980	+0.003		309 50.8	20 39.4	312 2.8	20 48.2	0.99956	1.28968	-6.28
	10	0.1116	0.989	0.010		310 11.5	20 40.8	311 1.2	20 44.1	1.00356	1.28902	6.37
	11	0.1144	0.997	0.016		310 23.6	20 41.6	309 59.4	20 40.0	1.00781	1.28836	6.46
	12	0.1171	1.006	0.018		310 27.8	20 41.9	308 57.6	20 35.9	1.01178	1.28772	6.54
	13	0.1198	1.015	0.016		310 26.4	20 41.8	307 55.5	20 31.7	1.01508	1.28708	6.63
	14	0.1226	+1.023	+0.012		310 22.5	20 41.5	306 53.3	20 27.6	1.01748	1.28645	-6.71
	15	0.1253	+1.031	+0.007		310 19.5	20 41.3	305 50.9	20 23.4	1.01898	1.28581	-6.79

FOR WASHINGTON MEAN MIDNIGHT.

r Day. Jerial our.)	r	f		f'		G		H		Log g.	Log h.	i	Log i.
		In Time.	In Time.	In Arc.	In Time.	In Arc.	In Time.						
	y	s	s	°	h m	°	h m					''	
b. 15	0.1253	+1.031	+0.007	310 19.5	20 41.3	305 50.9	20 23.4	1.01898	1.28581	-6.79	-0.8319		
16	0.1280	1.040	0.000	310 19.4	20 41.3	304 48.3	20 19.2	1.01967	1.28519	6.87	0.8368		
17	0.1308	1.048	-0.006	310 24.3	20 41.6	303 45.6	20 15.0	1.01987	1.28456	6.94	0.8416		
18	0.1335	1.056	0.010	310 34.5	20 42.3	302 42.7	20 10.8	1.01985	1.28396	7.02	0.8462		
h 19	0.1363	1.064	0.013	310 49.4	20 43.3	301 39.8	20 6.6	1.01995	1.28336	7.09	0.8506		
(10.0) 20	0.1390	+1.071	-0.013	311 8.1	20 44.5	300 36.7	20 2.4	1.02042	1.28279	-7.16	-0.8549		
21	0.1417	1.079	0.011	311 28.6	20 45.9	299 33.4	19 58.2	1.02146	1.28222	7.23	0.8589		
22	0.1445	1.087	0.007	311 49.3	20 47.3	298 30.1	19 54.0	1.02312	1.28166	7.29	0.8628		
23	0.1472	1.095	-0.002	312 8.4	20 48.6	297 26.5	19 49.8	1.02548	1.28111	7.35	0.8665		
24	0.1500	1.102	+0.003	312 23.8	20 49.6	296 22.9	19 45.5	1.02842	1.28058	7.42	0.8701		
25	0.1527	+1.110	+0.008	312 34.2	20 50.3	295 19.1	19 41.3	1.03167	1.28006	-7.47	-0.8735		
26	0.1554	1.117	0.010	312 38.7	20 50.6	294 15.3	19 37.0	1.03406	1.27957	7.53	0.8767		
27	0.1582	1.124	0.010	312 38.2	20 50.5	293 11.3	19 32.8	1.03792	1.27909	7.58	0.8798		
28	0.1609	1.131	0.008	312 34.5	20 50.3	292 7.2	19 28.5	1.04025	1.27861	7.63	0.8827		
Mar. 1	0.1636	1.139	+0.003	312 30.1	20 50.0	291 3.0	19 24.2	1.04171	1.27816	7.68	0.8854		
2	0.1664	+1.146	-0.003	312 28.5	20 49.9	289 58.7	19 19.9	1.04228	1.27773	-7.73	-0.8880		
3	0.1691	1.153	0.009	312 32.4	20 50.2	288 54.3	19 15.6	1.04217	1.27732	7.77	0.8905		
4	0.1718	1.160	0.014	312 43.6	20 50.9	287 49.8	19 11.3	1.04170	1.27693	7.81	0.8928		
5	0.1746	1.167	0.015	313 2.1	20 52.1	286 45.2	19 7.0	1.04140	1.27656	7.85	0.8950		
h 6	0.1773	1.174	0.012	313 26.0	20 53.7	285 40.6	19 2.7	1.04174	1.27621	7.89	0.8970		
(11.0) 7	0.1801	+1.181	-0.007	313 51.9	20 55.5	284 35.9	18 58.4	1.04296	1.27588	-7.92	-0.8989		
8	0.1828	1.188	+0.001	314 15.6	20 57.0	283 31.1	18 54.1	1.04516	1.27557	7.96	0.9006		
9	0.1855	1.194	0.009	314 33.6	20 58.2	282 26.3	18 49.8	1.04808	1.27529	7.98	0.9022		
10	0.1883	1.201	0.015	314 44.4	20 59.0	281 21.4	18 45.4	1.05130	1.27502	8.01	0.9037		
11	0.1910	1.208	0.018	314 47.8	20 59.2	280 16.4	18 41.1	1.05438	1.27478	8.04	0.9050		
12	0.1938	+1.214	+0.018	314 45.8	20 59.1	279 11.5	18 36.8	1.05690	1.27456	-8.06	-0.9062		
13	0.1965	1.221	0.014	314 41.3	20 58.7	278 6.5	18 32.4	1.05862	1.27436	8.08	0.9073		
14	0.1992	1.228	0.008	314 37.2	20 58.5	277 1.4	18 28.1	1.05947	1.27419	8.09	0.9082		
15	0.2020	1.234	+0.002	314 36.2	20 58.4	275 56.4	18 23.8	1.05963	1.27406	8.11	0.9090		
16	0.2047	1.241	-0.004	314 40.0	20 58.7	274 51.4	18 19.4	1.05927	1.27394	8.12	0.9096		
17	0.2074	+1.248	-0.009	314 48.7	20 59.2	273 46.3	18 15.1	1.05869	1.27383	-8.13	-0.9102		
18	0.2102	1.254	0.012	315 2.5	21 0.2	272 41.3	18 10.8	1.05821	1.27376	8.14	0.9106		
19	0.2129	1.261	0.013	315 20.1	21 1.3	271 36.3	18 6.4	1.05802	1.27371	8.14	0.9108		
20	0.2156	1.267	0.012	315 39.7	21 2.6	270 31.3	18 2.1	1.05834	1.27369	8.15	0.9109		
h 21	0.2184	1.274	0.009	315 59.7	21 4.0	269 26.4	17 57.8	1.05926	1.27368	8.15	0.9109		
(12.0) 22	0.2211	+1.280	-0.004	316 18.5	21 5.2	268 21.5	17 53.4	1.06075	1.27371	-8.14	-0.9108		
23	0.2239	1.287	+0.001	316 34.1	21 6.3	267 16.6	17 49.1	1.06280	1.27376	8.14	0.9105		
24	0.2266	1.293	0.006	316 45.4	21 7.0	266 11.9	17 44.8	1.06518	1.27383	8.13	0.9101		
25	0.2293	1.300	0.009	316 52.0	21 7.5	265 7.2	17 40.5	1.06769	1.27393	8.12	0.9096		
26	0.2321	1.306	0.010	316 53.8	21 7.6	264 2.6	17 36.2	1.06996	1.27405	8.11	0.9090		
27	0.2348	+1.313	+0.008	316 52.5	21 7.5	262 58.0	17 31.9	1.07175	1.27420	-8.09	-0.9082		
28	0.2376	1.320	+0.004	316 50.5	21 7.4	261 53.5	17 27.6	1.07279	1.27436	8.08	0.9073		
29	0.2403	1.326	-0.002	316 50.4	21 7.4	260 49.2	17 23.3	1.07303	1.27455	8.06	0.9062		
30	0.2430	1.333	0.008	316 55.5	21 7.7	259 44.9	17 19.0	1.07263	1.27478	8.04	0.9050		
31	0.2458	1.340	0.013	317 7.3	21 8.5	258 40.7	17 14.7	1.07190	1.27502	8.01	0.9038		
Apr. 1	0.2485	+1.346	-0.015	317 26.4	21 9.8	257 36.7	17 10.4	1.07125	1.27527	-7.99	-0.9023		
2	0.2512	+1.353	-0.013	317 51.2	21 11.4	256 32.7	17 6.2	1.07112	1.27555	-7.96	-0.9007		

FOR WASHINGTON MEAN MIDNIGHT.

Solar Day. (Sideral Hour.)	τ	f		f'		G		H		Log z .	Log h .	i	\angle
		In Time.		In Time.		In Arc.	In Time.	In Arc.	In Time.				
Apr. (18.0)	1	0.2485	+1.346	-0.015		317 26.4	21 9.8	257 36.7	17 10.4	1.07125	1.27527	-7.99	-0.4
	2	0.2512	1.353	0.013		317 51.2	21 11.4	256 32.7	17 6.2	1.07112	1.27555	7.96	0.1
	3	0.2540	1.360	0.008		318 18.5	21 13.2	255 28.9	17 1.9	1.07182	1.27585	7.93	0.1
	4	0.2567	1.367	-0.001		318 44.5	21 15.0	254 25.2	16 57.7	1.07339	1.27618	7.89	0.1
	5	0.2595	1.374	+0.007		319 5.7	21 16.4	253 21.6	16 53.4	1.07573	1.27652	7.86	0.1
	6	0.2622	+1.381	+0.014		319 20.4	21 17.4	252 18.2	16 49.2	1.07846	1.27688	-7.82	-0.1
	7	0.2649	1.388	0.018		319 27.9	21 17.9	251 14.9	16 45.0	1.08113	1.27726	7.78	0.1
	8	0.2677	1.395	0.019		319 29.8	21 18.0	250 11.7	16 40.8	1.08332	1.27766	7.74	0.1
	9	0.2704	1.402	0.016		319 28.7	21 17.9	249 8.7	16 36.6	1.08479	1.27808	7.69	0.1
	10	0.2732	1.409	0.011		319 27.9	21 17.9	248 5.8	16 32.4	1.08548	1.27852	7.64	0.1
	11	0.2759	+1.416	+0.004		319 29.5	21 18.0	247 3.2	16 28.2	1.08547	1.27897	-7.59	-0.1
	12	0.2786	1.423	-0.002		319 36.0	21 18.4	246 0.7	16 24.0	1.08500	1.27944	7.54	0.1
	13	0.2814	1.431	0.008		319 47.5	21 19.2	244 58.3	16 19.9	1.08429	1.27992	7.49	0.1
	14	0.2841	1.438	0.012		320 4.0	21 20.3	243 56.1	16 15.7	1.08366	1.28042	7.43	0.1
	15	0.2868	1.445	0.013		320 24.3	21 21.6	242 54.1	16 11.6	1.08338	1.28094	7.37	0.1
h (14.0)	16	0.2896	+1.453	-0.012		320 46.7	21 23.1	241 52.3	16 7.5	1.08354	1.28146	-7.31	-0.1
	17	0.2923	1.460	0.010		321 9.2	21 24.6	240 50.7	16 3.4	1.08431	1.28200	7.25	0.1
	18	0.2950	1.468	-0.005		321 31.4	21 26.1	239 49.2	15 59.3	1.08562	1.28255	7.19	0.1
	19	0.2978	1.476	0.000		321 50.1	21 27.3	238 48.0	15 55.2	1.08744	1.28311	7.12	0.1
	20	0.3005	1.484	+0.004		322 4.8	21 28.3	237 47.0	15 51.1	1.08964	1.28368	7.05	0.1
	21	0.3033	+1.492	+0.008		322 15.0	21 29.0	236 46.1	15 47.1	1.09194	1.28426	-6.98	-0.1
	22	0.3060	1.499	0.009		322 20.6	21 29.4	235 45.5	15 43.0	1.09413	1.28485	6.91	0.1
	23	0.3087	1.508	0.008		322 22.7	21 29.5	234 45.0	15 39.0	1.09589	1.28545	6.84	0.1
	24	0.3115	1.516	+0.004		322 24.4	21 29.6	233 44.8	15 35.0	1.09702	1.28606	6.76	0.1
	25	0.3142	1.524	-0.001		322 27.4	21 29.8	232 44.8	15 31.0	1.09747	1.28667	6.68	0.1
	26	0.3170	+1.532	-0.007		322 35.0	21 30.3	231 45.0	15 27.0	1.09736	1.28728	-6.60	-0.1
	27	0.3197	1.540	0.013		322 48.7	21 31.2	230 45.3	15 23.0	1.09689	1.28791	6.52	0.1
	28	0.3224	1.549	0.016		323 9.3	21 32.6	229 45.9	15 19.1	1.09651	1.28853	6.44	0.1
	29	0.3252	1.557	0.015		323 35.7	21 34.4	228 46.7	15 15.1	1.09660	1.28915	6.35	0.1
	30	0.3279	1.566	0.011		324 5.0	21 36.3	227 47.7	15 11.2	1.09746	1.28978	6.26	0.1
May (18.0)	1	0.3306	+1.575	-0.004		324 33.2	21 38.1	226 48.9	15 7.3	1.09925	1.29041	-6.17	-0.1
	2	0.3334	1.583	+0.004		324 58.0	21 39.9	225 50.3	15 3.4	1.10171	1.29104	6.08	0.1
	3	0.3361	1.592	0.012		325 15.9	21 41.1	224 51.8	14 59.5	1.10462	1.29168	5.99	0.1
	4	0.3389	1.601	0.018		325 27.0	21 41.8	223 53.6	14 55.6	1.10756	1.29232	5.90	0.1
	5	0.3416	1.610	0.020		325 32.2	21 42.1	222 55.6	14 51.7	1.11006	1.29295	5.80	0.1
	6	0.3443	+1.619	+0.018		325 34.1	21 42.3	221 57.7	14 47.8	1.11193	1.29358	-5.70	-0.1
	7	0.3471	1.628	0.014		325 35.7	21 42.4	221 0.1	14 44.0	1.11303	1.29421	5.60	0.1
	8	0.3498	1.638	+0.007		325 39.5	21 42.6	220 2.6	14 40.2	1.11348	1.29483	5.50	0.1
	9	0.3526	1.647	0.000		325 47.5	21 43.2	219 5.3	14 36.4	1.11345	1.29545	5.40	0.1
	10	0.3553	1.656	-0.006		326 0.5	21 44.0	218 8.2	14 32.5	1.11321	1.29607	5.30	0.1
	11	0.3580	+1.666	-0.010		326 18.2	21 45.2	217 11.3	14 28.8	1.11307	1.29668	-5.19	-0.1
	12	0.3608	1.676	0.012		326 39.5	21 46.6	216 14.6	14 25.0	1.11324	1.29729	5.08	0.1
	13	0.3635	1.685	0.012		327 2.8	21 48.2	215 18.1	14 21.2	1.11390	1.29789	4.98	0.1
	14	0.3662	1.695	0.010		327 26.3	21 49.7	214 21.7	14 17.4	1.11508	1.29848	4.87	0.1
	15	0.3690	1.705	0.006		327 48.4	21 51.2	213 25.6	14 13.7	1.11682	1.29907	4.76	0.1
h	16	0.3717	+1.715	-0.001		328 7.6	21 52.5	212 29.5	14 10.0	1.11901	1.29964	-4.65	-0.1
	17	0.3744	+1.725	+0.003		328 22.8	21 53.5	211 33.7	14 6.2	1.12152	1.30021	-4.53	-0.1

FOR WASHINGTON MEAN MIDNIGHT.

Star Day. (Sidereal Hour.)	τ	f		f'		G		H		Log g .	Log h .	i	Log z
		In Time.		In Time.		In Arc.	In Time.	In Arc.	In Time.				
	y	s		s		$^{\circ}$ $'$	h m	$^{\circ}$ $'$	h m			$''$	
May 17	0.3744	+1.725	+0.003	328 22.8	21 53.5	211 33.7	14 6.2	1.12152	1.30021	-4.53	-0.6563		
18	0.3772	1.735	0.007	328 33.6	21 54.2	210 38.0	14 2.5	1.12415	1.30077	4.42	0.6452		
19	0.3799	1.745	0.009	328 40.1	21 54.7	209 42.5	13 58.8	1.12665	1.30131	4.30	0.6337		
20	0.3827	1.755	0.009	328 43.2	21 54.9	208 47.2	13 55.1	1.12882	1.30185	4.18	0.6218		
21	0.3854	1.766	+0.005	328 45.1	21 55.0	207 52.0	13 51.5	1.13047	1.30238	4.07	0.6093		
(16.0) 22	0.3881	+1.776	0.000	328 48.1	21 55.2	206 57.0	13 47.8	1.13149	1.30289	-3.95	-0.5964		
23	0.3909	1.786	-0.006	328 54.8	21 55.7	206 2.1	13 44.1	1.13200	1.30339	3.83	0.5830		
24	0.3936	1.797	0.012	329 6.7	21 56.4	205 7.4	13 40.5	1.13218	1.30388	3.71	0.5691		
25	0.3964	1.808	0.016	329 25.0	21 57.7	204 12.8	13 36.9	1.13242	1.30435	3.58	0.5546		
26	0.3991	1.818	0.017	329 48.7	21 59.2	203 18.4	13 33.2	1.13308	1.30482	3.46	0.5394		
27	0.4018	+1.829	-0.014	330 15.3	22 1.0	202 24.1	13 29.6	1.13444	1.30527	-3.34	-0.5236		
28	0.4046	1.840	-0.008	330 41.6	22 2.8	201 29.9	13 26.0	1.13661	1.30570	3.21	0.5070		
29	0.4073	1.850	+0.001	331 4.2	22 4.3	200 35.9	13 22.4	1.13951	1.30613	3.09	0.4897		
30	0.4100	1.861	0.009	331 21.0	22 5.4	199 41.9	13 18.8	1.14283	1.30653	2.96	0.4715		
31	0.4128	1.872	0.016	331 31.2	22 6.1	198 48.1	13 15.2	1.14620	1.30691	2.83	0.4524		
June 1	0.4155	+1.883	+0.019	331 35.6	22 6.4	197 54.4	13 11.6	1.14922	1.30729	-2.71	-0.4324		
2	0.4183	1.894	0.019	331 36.6	22 6.4	197 0.8	13 8.1	1.15166	1.30764	2.58	0.4112		
3	0.4210	1.906	0.016	331 36.9	22 6.5	196 7.3	13 4.5	1.15339	1.30799	2.45	0.3888		
4	0.4237	1.917	0.010	331 38.8	22 6.6	195 13.9	13 0.9	1.15448	1.30832	2.32	0.3651		
h 5	0.4265	1.928	+0.003	331 44.4	22 7.0	194 20.5	12 57.4	1.15509	1.30863	2.19	0.3399		
(17.0) 6	0.4292	+1.939	-0.003	331 54.4	22 7.6	193 27.3	12 53.8	1.15550	1.30892	-2.06	-0.3130		
7	0.4320	1.950	0.008	332 8.6	22 8.6	192 34.1	12 50.3	1.15596	1.30919	1.92	0.2842		
8	0.4347	1.962	0.011	332 26.1	22 9.7	191 41.1	12 46.7	1.15667	1.30945	1.79	0.2532		
9	0.4374	1.973	0.011	332 45.4	22 11.0	190 48.0	12 43.2	1.15782	1.30969	1.66	0.2197		
10	0.4402	1.984	0.010	333 4.6	22 12.3	189 55.1	12 39.7	1.15943	1.30991	1.52	0.1833		
11	0.4429	+1.996	-0.007	333 22.6	22 13.5	189 2.2	12 36.1	1.16152	1.31011	-1.39	-0.1435		
12	0.4456	2.007	-0.002	333 38.0	22 14.5	188 9.4	12 32.6	1.16403	1.31030	1.26	0.0995		
13	0.4484	2.019	+0.003	333 49.7	22 15.3	187 16.6	12 29.1	1.16678	1.31047	1.12	0.0504		
14	0.4511	2.030	0.007	333 57.3	22 15.8	186 23.9	12 25.6	1.16965	1.31062	0.99	9.9949		
15	0.4538	2.042	0.009	334 0.9	22 16.1	185 31.2	12 22.1	1.17243	1.31074	0.85	9.9311		
16	0.4566	+2.053	+0.010	334 1.2	22 16.1	184 38.5	12 18.6	1.17491	1.31086	-0.72	-9.8563		
17	0.4593	2.065	0.007	334 0.1	22 16.0	183 45.9	12 15.1	1.17689	1.31095	0.58	9.7656		
18	0.4621	2.076	+0.002	333 59.5	22 16.0	182 53.4	12 11.6	1.17833	1.31101	0.45	9.6508		
19	0.4648	2.088	-0.004	334 1.4	22 16.1	182 0.8	12 8.1	1.17928	1.31106	0.31	9.4941		
20	0.4675	2.099	0.010	334 8.1	22 16.5	181 8.3	12 4.6	1.17993	1.31110	0.18	9.2464		
h 21	0.4703	+2.111	-0.016	334 20.1	22 17.3	180 15.8	12 1.1	1.18054	1.31111	-0.04	-8.6101		
(18.0) 22	0.4730	2.122	0.018	334 36.9	22 18.5	179 23.3	11 57.6	1.18147	1.31111	+0.10	+8.9770		
23	0.4758	2.134	0.016	334 56.8	22 19.8	178 30.8	11 54.1	1.18298	1.31110	0.23	9.3625		
24	0.4785	2.145	0.011	335 16.8	22 21.1	177 38.3	11 50.6	1.18520	1.31105	0.37	9.5633		
25	0.4812	2.157	-0.003	335 34.2	22 22.3	176 45.8	11 47.1	1.18808	1.31099	0.50	9.7000		
26	0.4840	+2.169	+0.005	335 46.5	22 23.1	175 53.3	11 43.6	1.19137	1.31091	+0.64	+9.8037		
27	0.4867	2.180	0.013	335 53.1	22 23.5	175 0.8	11 40.1	1.19479	1.31081	0.77	9.8873		
28	0.4894	2.192	0.018	335 54.3	22 23.6	174 8.2	11 36.5	1.19797	1.31070	0.91	9.9572		
29	0.4922	2.203	0.019	335 51.8	22 23.5	173 15.6	11 33.0	1.20060	1.31056	1.04	0.0173		
30	0.4949	2.214	0.017	335 48.3	22 23.2	172 23.0	11 29.5	1.20263	1.31040	1.18	0.0700		
y 1	0.4977	+2.226	+0.012	335 46.0	22 23.1	171 30.4	11 26.0	1.20404	1.31023	+1.31	+0.1169		
2	0.5004	+2.237	+0.005	335 46.6	22 23.1	170 37.7	11 22.5	1.20496	1.31004	+1.44	+0.1591		

FOR WASHINGTON MEAN MIDNIGHT.

Solar Day. (Sidereal Hour.)	τ	f		f'		G		H		Log g .	Log h .	i	Log i .
		In Time.	In Time.	In Arc.	In Time.	In Arc.	In Time.						
July	y	s	s	°	'	h	m	°	'	h	m	"	
	1	0.4977	+2.226	+0.012	335 46.0	22 23.1	171 30.4	11 26.0	1.20404	1.31023	+1.31	+0.116	
	2	0.5004	2.237	+0.005	335 46.6	22 23.1	170 37.7	11 22.5	1.20496	1.31004	1.44	0.155	
	3	0.5031	2.249	-0.001	335 51.1	22 23.4	169 44.9	11 19.0	1.20564	1.30983	1.58	0.197	
	4	0.5059	2.260	0.006	335 59.6	22 24.0	168 52.1	11 15.5	1.20631	1.30960	1.71	0.232	
	5	0.5086	2.271	0.010	336 11.1	22 24.7	167 59.2	11 11.9	1.20716	1.30936	1.84	0.265	
	h	6	0.5114	+2.283	-0.011	336 24.5	22 25.6	167 6.3	11 8.4	1.20839	1.30909	+1.97	+0.295
	(19.0)	7	0.5141	2.294	0.010	336 38.1	22 26.5	166 13.3	11 4.9	1.20997	1.30881	2.10	0.323
	8	0.5168	2.305	0.007	336 50.5	22 27.4	165 20.2	11 1.3	1.21198	1.30852	2.23	0.345	
	9	0.5196	2.316	-0.003	337 0.7	22 28.0	164 27.0	10 57.8	1.21433	1.30820	2.36	0.373	
	10	0.5223	2.327	+0.002	337 7.9	22 28.5	163 33.7	10 54.2	1.21692	1.30787	2.49	0.395	
	11	0.5250	+2.338	+0.006	337 11.4	22 28.8	162 40.4	10 50.7	1.21959	1.30752	+2.62	+0.418	
	12	0.5278	2.349	0.009	337 11.4	22 28.8	161 47.0	10 47.1	1.22222	1.30716	2.75	0.439	
	13	0.5305	2.360	0.010	337 8.5	22 28.6	160 53.5	10 43.6	1.22457	1.30679	2.88	0.459	
	14	0.5332	2.371	0.009	337 3.9	22 28.3	159 59.8	10 40.0	1.22654	1.30639	3.00	0.477	
	15	0.5360	2.382	+0.005	336 59.3	22 28.0	159 6.1	10 36.4	1.22802	1.30598	3.13	0.495	
	16	0.5387	+2.393	-0.001	336 56.7	22 27.8	158 12.3	10 32.8	1.22905	1.30555	+3.26	+0.512	
	17	0.5415	2.404	0.008	336 57.9	22 27.9	157 18.3	10 29.2	1.22972	1.30511	3.38	0.528	
	18	0.5442	2.414	0.014	337 3.4	22 28.2	156 24.3	10 25.6	1.23028	1.30466	3.50	0.544	
	19	0.5469	2.425	0.017	337 13.5	22 28.9	155 30.1	10 22.0	1.23102	1.30420	3.62	0.559	
	20	0.5497	2.435	0.017	337 26.9	22 29.8	154 35.8	10 18.4	1.23222	1.30373	3.74	0.573	
h	21	0.5524	+2.446	-0.013	337 41.1	22 30.7	153 41.4	10 14.8	1.23400	1.30324	+3.86	+0.587	
(20.0)	22	0.5552	2.457	-0.007	337 53.6	22 31.6	152 46.9	10 11.1	1.23638	1.30274	3.98	0.603	
23	0.5579	2.466	+0.002	338 2.3	22 32.2	151 52.2	10 7.5	1.23921	1.30222	4.10	0.613		
24	0.5606	2.476	0.009	338 5.8	22 32.4	150 57.4	10 3.8	1.24220	1.30169	4.22	0.623		
25	0.5634	2.487	0.015	338 4.4	22 32.3	150 2.4	10 0.2	1.24501	1.30116	4.33	0.633		
26	0.5661	+2.497	+0.018	337 59.6	22 32.0	149 7.3	9 56.5	1.24749	1.30061	+4.45	+0.643		
27	0.5688	2.507	0.017	337 52.9	22 31.5	148 12.0	9 52.8	1.24939	1.30006	4.56	0.655		
28	0.5716	2.517	0.013	337 47.2	22 31.1	147 16.6	9 49.1	1.25071	1.29949	4.67	0.665		
29	0.5743	2.527	+0.007	337 44.0	22 30.9	146 21.0	9 45.4	1.25156	1.29892	4.78	0.679		
30	0.5771	2.536	0.000	337 44.2	22 31.0	145 25.3	9 41.7	1.25211	1.29834	4.89	0.689		
Aug.	31	0.5798	+2.546	-0.005	337 48.1	22 31.2	144 29.4	9 38.0	1.25259	1.29775	+5.00	+0.699	
	1	0.5825	2.556	0.009	337 55.2	22 31.7	143 33.3	9 34.2	1.25320	1.29716	5.11	0.708	
	2	0.5853	2.565	0.011	338 4.1	22 32.3	142 37.1	9 30.5	1.25406	1.29656	5.21	0.717	
	3	0.5880	2.575	0.010	338 13.7	22 32.9	141 40.6	9 26.7	1.25528	1.29595	5.32	0.725	
	4	0.5908	2.584	0.008	338 22.6	22 33.5	140 44.0	9 22.9	1.25684	1.29534	5.42	0.734	
	h	5	0.5935	+2.594	-0.004	338 29.6	22 34.0	139 47.2	9 19.1	1.25871	1.29472	+5.52	+0.742
	(21.0)	6	0.5962	2.603	+0.001	338 34.1	22 34.3	138 50.2	9 15.3	1.26081	1.29410	5.62	0.745
	7	0.5990	2.612	0.005	338 35.7	22 34.4	137 53.1	9 11.5	1.26302	1.29347	5.72	0.751	
	8	0.6017	2.621	0.009	338 34.1	22 34.3	136 55.8	9 7.7	1.26521	1.29284	5.81	0.761	
	9	0.6044	2.630	0.011	338 29.9	22 34.0	135 58.2	9 3.9	1.26718	1.29223	5.91	0.771	
	10	0.6072	+2.639	+0.010	338 23.8	22 33.6	135 0.5	9 0.0	1.26886	1.29160	+6.00	+0.771	
11	0.6099	2.647	0.007	338 17.4	22 33.2	134 2.7	8 56.2	1.27011	1.29097	6.09	0.78		
12	0.6126	2.656	+0.002	338 12.4	22 32.8	133 4.6	8 52.3	1.27092	1.29034	6.18	0.79		
13	0.6153	2.665	-0.005	338 10.4	22 32.7	132 6.3	8 48.4	1.27140	1.28971	6.27	0.79		
14	0.6181	2.673	0.011	338 12.4	22 32.8	131 7.8	8 44.5	1.27168	1.28909	6.36	0.80		
15	0.6209	+2.682	-0.015	338 18.6	22 33.2	130 9.2	8 40.6	1.27202	1.28847	+6.44	+0.80		
16	0.6236	+2.690	-0.017	338 28.3	22 33.9	129 10.4	8 36.7	1.27270	1.28785	+6.52	+0.81		

FOR WASHINGTON MEAN MIDNIGHT.

Solar Day. (Sidereal Hour.)	τ	f		f'		G		H		Log g .	Log h .	i	Log i .
		In Time.		In Time.		In Arc.	In Time.	In Arc.	In Time.				
	y	s		s		$^{\circ}$ $'$	h m	$^{\circ}$ $'$	h m			$''$	
Aug. 16	0.6236	+2.690	-0.017	338 28.3	22 33.9	129 10.4	8 36.7	1.27270	1.28785	+6.52	+0.8146		
17	0.6263	2.698	0.014	338 39.3	22 34.6	128 11.4	8 32.8	1.27386	1.28725	6.61	0.8199		
18	0.6291	2.707	0.009	338 49.9	22 35.3	127 12.2	8 28.8	1.27556	1.28664	6.68	0.8251		
19	0.6318	2.715	-0.001	338 57.4	22 35.8	126 12.8	8 24.8	1.27769	1.28603	6.76	0.8301		
20	0.6346	2.723	+0.007	339 0.8	22 36.1	125 13.2	8 20.9	1.28011	1.28543	6.84	0.8349		
h 21	0.6373	+2.731	+0.013	338 59.5	22 36.0	124 13.5	8 16.9	1.28246	1.28484	+6.91	+0.8395		
(22.0) 22	0.6400	2.739	0.017	338 54.6	22 35.6	123 13.6	8 12.9	1.28450	1.28426	6.98	0.8440		
23	0.6428	2.746	0.017	338 47.6	22 35.2	122 13.5	8 8.9	1.28606	1.28369	7.05	0.8483		
24	0.6455	2.754	0.014	338 41.0	22 34.7	121 13.2	8 4.9	1.28712	1.28312	7.12	0.8524		
25	0.6482	2.762	0.008	338 36.2	22 34.4	120 12.7	8 0.8	1.28769	1.28257	7.18	0.8564		
26	0.6510	+2.769	+0.002	338 34.7	22 34.3	119 12.0	7 56.8	1.28794	1.28202	+7.25	+0.8603		
27	0.6537	2.777	-0.004	338 36.8	22 34.5	118 11.2	7 52.7	1.28808	1.28149	7.31	0.8639		
28	0.6565	2.784	0.009	338 42.1	22 34.8	117 10.2	7 48.7	1.28829	1.28097	7.37	0.8675		
29	0.6592	2.792	0.011	338 49.6	22 35.3	116 9.0	7 44.6	1.28872	1.28047	7.43	0.8708		
30	0.6619	2.799	0.011	338 58.2	22 35.9	115 7.7	7 40.5	1.28944	1.27997	7.48	0.8741		
31	0.6647	+2.806	-0.009	339 6.4	22 36.4	114 6.1	7 36.4	1.29048	1.27950	+7.54	+0.8772		
Sept. 1	0.6674	2.814	0.006	339 13.3	22 36.9	113 4.4	7 32.3	1.29181	1.27903	7.59	0.8801		
2	0.6702	2.821	-0.001	339 18.1	22 37.2	112 2.5	7 28.2	1.29337	1.27857	7.64	0.8829		
3	0.6729	2.828	+0.004	339 20.3	22 37.3	111 0.5	7 24.0	1.29508	1.27814	7.68	0.8855		
4	0.6756	2.835	0.008	339 19.7	22 37.2	109 58.4	7 19.9	1.29676	1.27773	7.73	0.8881		
h 5	0.6784	+2.842	+0.010	339 16.6	22 37.1	108 56.0	7 15.7	1.29835	1.27733	+7.77	+0.8904		
(23.0) 6	0.6811	2.849	0.010	339 11.8	22 36.8	107 53.5	7 11.6	1.29968	1.27695	7.81	0.8927		
7	0.6838	2.855	0.008	339 6.3	22 36.4	106 50.9	7 7.4	1.30064	1.27659	7.85	0.8948		
8	0.6866	2.862	+0.004	339 1.8	22 36.1	105 48.2	7 3.2	1.30123	1.27625	7.88	0.8968		
9	0.6893	2.869	-0.003	338 59.6	22 36.0	104 45.3	6 59.0	1.30146	1.27593	7.92	0.8986		
10	0.6920	+2.876	-0.009	339 1.0	22 36.1	103 42.3	6 54.8	1.30147	1.27563	+7.95	+0.9004		
11	0.6948	2.882	0.014	339 6.5	22 36.4	102 39.1	6 50.6	1.30149	1.27534	7.98	0.9019		
12	0.6975	2.889	0.016	339 15.5	22 37.0	101 35.9	6 46.4	1.30172	1.27507	8.00	0.9034		
13	0.7003	2.896	0.015	339 26.8	22 37.8	100 32.6	6 42.2	1.30236	1.27483	8.03	0.9047		
14	0.7030	2.902	0.010	339 38.1	22 38.5	99 29.2	6 38.0	1.30353	1.27462	8.05	0.9059		
15	0.7057	+2.909	-0.003	339 47.2	22 39.1	98 25.6	6 33.7	1.30514	1.27442	+8.07	+0.9070		
16	0.7085	2.915	+0.005	339 52.7	22 39.5	97 22.0	6 29.5	1.30701	1.27425	8.09	0.9079		
17	0.7112	2.922	0.012	339 54.0	22 39.6	96 18.4	6 25.2	1.30895	1.27410	8.11	0.9088		
18	0.7140	2.928	0.016	339 51.6	22 39.4	95 14.6	6 21.0	1.31070	1.27397	8.12	0.9094		
19	0.7167	2.935	0.017	339 46.7	22 39.1	94 10.8	6 16.7	1.31201	1.27387	8.13	0.9100		
h 20	0.7194	+2.941	+0.015	339 41.5	22 38.8	93 6.9	6 12.5	1.31284	1.27379	+8.14	+0.9104		
(24.0) 21	0.7222	2.948	0.010	339 37.8	22 38.5	92 3.0	6 8.2	1.31323	1.27373	8.14	0.9107		
22	0.7249	2.954	+0.003	339 36.9	22 38.5	90 59.0	6 3.9	1.31325	1.27369	8.15	0.9109		
23	0.7276	2.960	-0.003	339 39.7	22 38.6	89 55.0	5 59.7	1.31314	1.27368	8.15	0.9109		
24	0.7304	2.967	0.008	339 45.7	22 39.0	88 50.9	5 55.4	1.31307	1.27370	8.14	0.9109		
25	0.7331	+2.973	-0.011	339 54.4	22 39.6	87 46.9	5 51.1	1.31317	1.27374	+8.14	+0.9107		
26	0.7359	2.980	0.012	340 4.3	22 40.3	86 42.8	5 46.8	1.31358	1.27379	8.14	0.9104		
27	0.7386	2.986	0.010	340 14.4	22 41.0	85 38.6	5 42.6	1.31429	1.27387	8.13	0.9099		
28	0.7413	2.993	0.007	340 23.4	22 41.6	84 34.5	5 38.3	1.31529	1.27398	8.12	0.9093		
29	0.7441	2.999	-0.002	340 30.6	22 42.0	83 30.3	5 34.0	1.31654	1.27412	8.10	0.9086		
30	0.7468	+3.006	+0.002	340 35.4	22 42.4	82 26.2	5 29.7	1.31791	1.27428	+8.09	+0.9078		
Oct. 1	0.7496	+3.012	+0.006	340 37.7	22 42.5	81 22.1	5 25.5	1.31935	1.27446	+8.07	+0.9068		

FOR WASHINGTON MEAN MIDNIGHT.

Solar Day. (Sideral Hour.)	τ	f		f'		G		H		Log g .	Log h .	i	L
		In Time.		In Time.		In Arc.	In Time.	In Arc.	In Time.				
Oct.	1	0.7496	+3.012	+0.006		340 37.7	22 42.5	81 22.1	5 25.5	1.31935	1.27446	+8.07	+o
	2	0.7523	3.019	0.009		340 37.5	22 42.5	80 18.0	5 21.2	1.32067	1.27465	8.05	o
	3	0.7550	3.025	0.010		340 35.5	22 42.4	79 13.9	5 16.9	1.32184	1.27488	8.03	o
	4	0.7578	3.032	0.008		340 32.8	22 42.2	78 9.8	5 12.7	1.32269	1.27514	8.00	o
	5	0.7605	3.039	+0.004		340 30.5	22 42.0	77 5.7	5 8.4	1.32320	1.27540	7.97	o
	6	0.7632	+3.045	-0.001		340 30.1	22 42.0	76 1.7	5 4.1	1.32339	1.27569	+7.94	+o
	7	0.7660	3.052	0.007		340 32.9	22 42.2	74 57.8	4 59.9	1.32335	1.27601	7.91	o
	8	0.7687	3.059	0.012		340 39.6	22 42.6	73 53.9	4 55.6	1.32328	1.27634	7.88	o
	9	0.7714	3.066	0.015		340 49.9	22 43.3	72 50.1	4 51.3	1.32336	1.27669	7.84	o
	10	0.7742	3.072	0.015		341 2.7	22 44.2	71 46.4	4 47.1	1.32380	1.27706	7.80	o
	11	0.7769	+3.079	-0.011		341 16.2	22 45.1	70 42.7	4 42.8	1.32474	1.27746	+7.76	+o
	12	0.7797	3.086	-0.005		341 28.2	22 45.9	69 39.1	4 38.6	1.32614	1.27788	7.71	o
	13	0.7824	3.093	+0.003		341 37.2	22 46.5	68 35.6	4 34.4	1.32788	1.27831	7.67	o
	14	0.7851	3.100	0.011		341 42.0	22 46.8	67 32.3	4 30.2	1.32970	1.27876	7.62	o
	15	0.7879	3.107	0.016		341 43.1	22 46.9	66 29.0	4 25.9	1.33142	1.27923	7.57	o
	16	0.7906	+3.115	+0.018		341 41.4	22 46.8	65 25.8	4 21.7	1.33277	1.27971	+7.51	+o
	17	0.7934	3.122	0.017		341 38.8	22 46.6	64 22.7	4 17.5	1.33369	1.28021	7.46	o
	18	0.7961	3.129	0.012		341 37.2	22 46.5	63 19.8	4 13.3	1.33413	1.28072	7.40	o
	19	0.7988	3.137	+0.006		341 38.2	22 46.5	62 17.0	4 9.1	1.33426	1.28125	7.34	o
	20	0.8016	3.144	-0.001		341 42.4	22 46.8	61 14.2	4 4.9	1.33418	1.28180	7.28	o
Nov.	21	0.8043	+3.152	-0.007		341 50.0	22 47.3	60 11.6	4 0.8	1.33412	1.28235	+7.21	+c
	22	0.8070	3.159	0.010		342 0.2	22 48.0	59 9.1	3 56.6	1.33422	1.28292	7.14	c
	23	0.8098	3.167	0.012		342 12.1	22 48.8	58 6.8	3 52.5	1.33462	1.28350	7.08	c
	24	0.8125	3.175	0.011		342 24.3	22 49.6	57 4.7	3 48.3	1.33533	1.28409	7.00	c
	25	0.8153	3.182	0.008		342 35.4	22 50.4	56 2.6	3 44.2	1.33635	1.28469	6.93	c
	26	0.8180	+3.190	-0.004		342 45.3	22 51.0	55 0.7	3 40.0	1.33760	1.28530	+6.86	+c
	27	0.8207	3.198	+0.001		342 52.6	22 51.5	53 58.9	3 35.9	1.33901	1.28591	6.78	c
	28	0.8235	3.207	0.005		342 57.6	22 51.8	52 57.2	3 31.8	1.34050	1.28654	6.70	c
	29	0.8262	3.215	0.008		343 0.1	22 52.0	51 55.7	3 27.7	1.34192	1.28717	6.62	c
	30	0.8290	3.223	0.009		343 0.6	22 52.0	50 54.4	3 23.6	1.34318	1.28780	6.53	c
	31	0.8317	+3.232	+0.008		343 0.3	22 52.0	49 53.2	3 19.5	1.34419	1.28844	+6.45	+c
	1	0.8344	3.240	+0.005		342 59.9	22 52.0	48 52.1	3 15.5	1.34490	1.28909	6.36	c
	2	0.8372	3.249	0.000		343 1.0	22 52.1	47 51.2	3 11.4	1.34532	1.28974	6.27	c
	3	0.8399	3.257	-0.006		343 4.8	22 52.3	46 50.4	3 7.4	1.34552	1.29040	6.18	c
	4	0.8426	3.266	0.012		343 12.2	22 52.8	45 49.8	3 3.3	1.34565	1.29105	6.08	c
Dec.	5	0.8454	+3.275	-0.016		343 23.0	22 53.4	44 49.2	2 59.3	1.34593	1.29171	+5.98	+c
	6	0.8481	3.284	0.016		343 36.4	22 54.4	43 48.9	2 55.3	1.34651	1.29237	5.89	c
	7	0.8508	3.293	0.014		343 50.9	22 55.4	42 48.8	2 51.3	1.34757	1.29303	5.79	c
	8	0.8536	3.302	-0.008		344 4.4	22 56.3	41 48.7	2 47.3	1.34907	1.29368	5.69	c
	9	0.8563	3.311	0.000		344 15.4	22 57.0	40 48.8	2 43.3	1.35095	1.29433	5.58	c
	10	0.8591	+3.321	+0.008		344 22.4	22 57.4	39 49.1	2 39.3	1.35299	1.29498	+5.48	+c
	11	0.8618	3.330	0.015		344 25.7	22 57.7	38 49.6	2 35.3	1.35492	1.29563	5.37	c
	12	0.8645	3.340	0.019		344 25.7	22 57.7	37 50.2	2 31.3	1.35659	1.29626	5.26	c
	13	0.8673	3.349	0.018		344 24.6	22 57.6	36 50.9	2 27.4	1.35790	1.29690	5.15	c
	14	0.8700	3.359	0.015		344 23.8	22 57.4	35 51.8	2 23.5	1.35874	1.29753	5.04	c
	15	0.8728	+3.369	+0.009		344 24.9	22 57.5	34 52.9	2 19.5	1.35918	1.29816	+4.93	+c
	16	0.8755	+3.379	+0.002		344 29.1	22 57.9	33 54.1	2 15.6	1.35944	1.29877	+4.81	+c

FOR WASHINGTON MEAN MIDNIGHT.

Day. Local (our.)	r	f		f'		G		H		Log g.	Log h.	i	Log i.
		In Time.		In Time.		In Arc.	In Time.	In Arc.	In Time.				
	y	s	s	s	'	h	m	'	h	m		"	
ov. 16	0.8755	+3.379	+0.002	344 29.1	22 57.9	33 54.1	2 15.6	1.35944	1.29877	+4.81	+0.6825		
17	0.8782	3.389	-0.004	344 36.4	22 58.4	32 55.4	2 11.7	1.35967	1.29937	4.70	0.6718		
18	0.8810	3.399	0.009	344 46.5	22 59.1	31 56.8	2 7.8	1.36002	1.29996	4.58	0.6608		
19	0.8837	3.409	0.011	344 58.1	22 59.9	30 58.4	2 3.9	1.36065	1.30055	4.46	0.6493		
h (40) 20	0.8864	3.420	0.011	345 10.3	23 0.7	30 0.2	2 0.0	1.36160	1.30113	4.34	0.6374		
21	0.8892	+3.430	-0.008	345 21.7	23 1.4	29 2.1	1 56.1	1.36285	1.30170	+4.22	+0.6250		
22	0.8919	3.440	-0.005	345 31.4	23 2.1	28 4.1	1 52.3	1.36431	1.30226	4.09	0.6121		
23	0.8947	3.451	0.000	345 39.1	23 2.6	27 6.2	1 48.4	1.36596	1.30280	3.97	0.5986		
24	0.8974	3.462	+0.004	345 44.2	23 2.9	26 8.4	1 44.6	1.36766	1.30333	3.84	0.5846		
25	0.9002	3.472	0.008	345 47.1	23 3.1	25 10.8	1 40.7	1.36935	1.30384	3.72	0.5700		
26	0.9029	+3.483	+0.009	345 47.9	23 3.2	24 13.2	1 36.9	1.37088	1.30434	+3.59	+0.5547		
27	0.9056	3.494	0.009	345 47.5	23 3.2	23 15.8	1 33.1	1.37219	1.30484	3.46	0.5387		
28	0.9084	3.505	0.006	345 46.9	23 3.1	22 18.5	1 29.2	1.37323	1.30531	3.33	0.5219		
29	0.9111	3.516	+0.001	345 47.2	23 3.1	21 21.3	1 25.4	1.37399	1.30577	3.19	0.5043		
30	0.9138	3.527	-0.005	345 49.6	23 3.3	20 24.1	1 21.6	1.37452	1.30620	3.06	0.4858		
Dec. 1	0.9166	+3.538	-0.011	345 55.0	23 3.7	19 27.1	1 17.8	1.37497	1.30663	+2.93	+0.4664		
2	0.9193	3.550	0.016	346 3.6	23 4.2	18 30.2	1 14.0	1.37551	1.30704	2.79	0.4458		
3	0.9220	3.561	0.018	346 14.9	23 5.0	17 33.3	1 10.2	1.37631	1.30743	2.66	0.4242		
4	0.9248	3.572	0.016	346 27.4	23 5.8	16 36.5	1 6.4	1.37751	1.30781	2.52	0.4012		
h (0) 5	0.9275	3.584	0.011	346 39.4	23 6.6	15 39.8	1 2.7	1.37916	1.30816	2.38	0.3768		
6	0.9302	+3.595	-0.004	346 49.2	23 7.3	14 43.2	0 58.9	1.38117	1.30850	+2.24	+0.3507		
7	0.9330	3.607	+0.005	346 55.7	23 7.7	13 46.6	0 55.1	1.38342	1.30882	2.10	0.3229		
8	0.9357	3.618	0.013	346 58.3	23 7.9	12 50.1	0 51.3	1.38563	1.30911	1.96	0.2930		
9	0.9385	3.630	0.018	346 57.8	23 7.9	11 53.7	0 47.6	1.38762	1.30938	1.82	0.2608		
10	0.9412	3.642	0.019	346 55.5	23 7.7	10 57.3	0 43.8	1.38923	1.30965	1.68	0.2257		
11	0.9439	+3.654	+0.017	346 53.0	23 7.5	10 0.9	0 40.1	1.39043	1.30989	+1.54	+0.1875		
12	0.9467	3.665	0.012	346 52.1	23 7.5	9 4.7	0 36.3	1.39126	1.31010	1.40	0.1454		
13	0.9494	3.677	+0.005	346 53.6	23 7.6	8 8.5	0 32.6	1.39182	1.31030	1.26	0.0987		
14	0.9522	3.689	-0.002	346 58.2	23 7.9	7 12.3	0 28.8	1.39231	1.31047	1.11	0.0461		
15	0.9549	3.701	0.007	347 5.3	23 8.4	6 16.1	0 25.1	1.39289	1.31063	0.97	0.9861		
16	0.9576	+3.713	-0.010	347 14.2	23 8.9	5 20.0	0 21.3	1.39369	1.31076	+0.83	+0.9163		
17	0.9604	3.725	0.010	347 23.6	23 9.6	4 23.9	0 17.6	1.39476	1.31088	0.68	0.8329		
18	0.9631	3.736	0.009	347 32.4	23 10.2	3 27.8	0 13.9	1.39610	1.31098	0.54	0.7294		
19	0.9658	3.748	0.005	347 39.9	23 10.7	2 31.8	0 10.1	1.39771	1.31104	0.39	0.5931		
20	0.9686	3.760	-0.001	347 45.3	23 11.0	1 35.8	0 6.4	1.39942	1.31109	0.25	0.3931		
0) 21	0.9713	+3.772	+0.004	347 48.7	23 11.2	0 39.7	0 2.6	1.40121	1.31111	+0.10	+0.0107		
22	0.9741	3.784	0.007	347 49.4	23 11.3	359 43.6	23 58.9	1.40300	1.31111	-0.04	-8.6260		
23	0.9768	3.796	0.010	347 48.3	23 11.2	358 47.6	23 55.2	1.40463	1.31110	0.19	9.2719		
24	0.9795	3.808	0.010	347 45.9	23 11.1	357 51.5	23 51.4	1.40610	1.31107	0.33	9.5208		
25	0.9823	3.820	0.008	347 43.1	23 10.9	356 55.4	23 47.7	1.40730	1.31100	0.48	9.6780		
26	0.9850	+3.832	+0.003	347 40.8	23 10.7	355 59.3	23 44.0	1.40824	1.31092	-0.62	-9.7931		
27	0.9878	3.844	-0.003	347 40.0	23 10.7	355 3.1	23 40.2	1.40891	1.31081	0.76	9.8838		
28	0.9905	3.856	0.009	347 41.8	23 10.8	354 6.9	23 36.5	1.40948	1.31069	0.91	9.9588		
29	0.9932	3.868	0.015	347 46.4	23 11.1	353 10.7	23 32.7	1.41007	1.31055	1.05	0.0226		
30	0.9960	3.880	0.018	347 53.6	23 11.6	352 14.4	23 29.0	1.41084	1.31038	1.20	0.0780		
31	0.9987	+3.892	-0.018	348 2.3	23 12.2	351 18.1	23 25.2	1.41194	1.31019	-1.34	-0.1271		
32	1.0014	+3.903	-0.014	348 11.0	23 12.7	350 21.7	23 21.4	1.41344	1.30998	-1.48	-0.1711		

230 BESSELIAN AND INDEPENDENT STAR-NUMBERS, 1915.

FOR WASHINGTON SIDEREAL TWELVE HOURS.

Mean Solar Date.	Log A ₁ .	Log B ₁ .	Log C.	Log D.	f	G ₁	H	Log g ₁ .	Log h.	Log i.
Jan. 0.72	+0.2573	-0.8651	-0.5110	+1.3045	+0.557	296 19	350 52	0.9126	1.3101	-0.1483
10.70	9.3405	0.8683	0.8100	1.2838	0.674	300 44	341 26	0.9340	1.3070	0.4473
20.67	9.4068	0.8745	0.9761	1.2475	0.786	304 20	331 50	0.9576	1.3022	0.6134
30.64	9.4602	0.8826	1.0853	1.1928	0.888	307 10	322 1	0.9811	1.2962	0.7226
Feb. 9.61	9.5034	0.8910	1.1611	1.1145	0.981	309 23	311 56	1.0029	1.2896	0.7984
19.59	+0.5389	-0.8985	-1.2137	+1.0023	+1.065	311 13	301 34	1.0221	1.2833	-0.8510
Mar. 1.56	9.5685	0.9040	1.2483	0.8323	1.139	312 48	290 59	1.0384	1.2781	0.8856
11.53	9.5940	0.9066	1.2678	+0.5247	1.208	314 18	280 14	1.0519	1.2748	0.9051
21.50	9.6171	0.9057	1.2736	-0.2669	1.274	315 53	269 26	1.0630	1.2737	0.9109
31.48	9.6390	0.9012	1.2665	0.5670	1.340	317 37	258 42	1.0725	1.2750	0.9038
Apr. 10.45	+0.6608	-0.8934	-1.2461	-0.8492	+1.409	319 33	248 9	1.0814	1.2785	-0.8834
20.42	9.6832	0.8827	1.2114	1.0095	1.484	321 42	237 52	1.0905	1.2836	0.8486
30.40	9.7066	0.8700	1.1601	1.1161	1.565	323 59	227 54	1.1006	1.2897	0.7973
May 10.37	9.7310	0.8562	1.0879	1.1909	1.655	326 21	218 16	1.1126	1.2960	0.7252
20.34	9.7561	0.8425	0.9864	1.2439	1.753	328 40	208 56	1.1266	1.3018	0.6237
30.31	+0.7815	-0.8302	-0.8377	-1.2798	+1.859	330 50	199 52	1.1424	1.3065	-0.4750
June 9.28	9.8068	0.8204	0.5898	1.3016	1.971	332 46	190 59	1.1598	1.3096	0.2271
19.26	9.8312	0.8139	-9.9005	1.3107	2.085	334 23	182 14	1.1782	1.3110	-9.5378
29.23	9.8546	0.8112	+0.3647	1.3078	2.200	335 42	173 30	1.1969	1.3106	+0.0020
July 9.20	9.8763	0.8123	0.7293	1.2926	2.313	336 42	164 43	1.2152	1.3083	0.3666
19.18	+0.8962	-0.8166	+0.9171	-1.2644	+2.422	337 27	155 48	1.2327	1.3044	+0.5544
29.15	9.9141	0.8232	1.0389	1.2211	2.524	337 58	146 41	1.2490	1.2991	0.6762
Aug. 8.12	9.9300	0.8310	1.1245	1.1592	2.618	338 20	137 17	1.2638	1.2931	0.7618
18.09	9.9441	0.8387	1.1857	1.0723	2.703	338 37	127 36	1.2771	1.2869	0.8230
28.07	9.9564	0.8451	1.2287	0.9473	2.781	338 53	117 37	1.2886	1.2812	0.8659
Sept. 7.04	+0.9674	-0.8491	+1.2566	-0.7508	+2.852	339 12	107 20	1.2987	1.2768	+0.8938
17.01	9.9774	0.8500	1.2711	-0.3491	2.919	339 36	96 49	1.3076	1.2742	0.9084
26.98	9.9869	0.8471	1.2729	+0.0958	2.983	340 7	86 12	1.3156	1.2738	0.9102
Oct. 6.96	9.9963	0.8402	1.2618	0.6732	3.048	340 48	75 32	1.3232	1.2758	0.8991
16.93	0.0061	0.8294	1.2371	0.9061	3.118	341 38	64 59	1.3308	1.2799	0.8744
26.90	+0.0166	-0.8151	+1.1967	+1.0484	+3.194	342 35	54 36	1.3390	1.2855	+0.8340
Nov. 5.88	0.0279	0.7985	1.1371	1.1456	3.278	343 36	44 26	1.3479	1.2920	0.7744
15.85	0.0402	0.7806	1.0519	1.2142	3.372	344 39	34 32	1.3580	1.2984	0.6892
25.82	0.0533	0.7633	0.9278	1.2617	3.476	345 39	24 52	1.3691	1.3040	0.5651
Dec. 5.79	0.0670	0.7482	0.7320	1.2924	3.587	346 32	15 23	1.3811	1.3083	0.3691
15.77	+0.0809	-0.7371	+0.3314	+1.3083	+3.704	347 16	6 1	1.3937	1.3107	+0.9689
25.74	0.0947	0.7311	-0.0711	1.3102	3.823	347 49	356 42	1.4065	1.3110	-9.7084
35.71	+0.1079	-0.7306	-0.6501	+1.2985	+3.941	348 11	347 20	1.4192	1.3092	-0.2874

$E = +0^{\circ}.002.$

The above numbers give the same reductions from mean to apparent place as are employed in computing the apparent places of the fixed stars, given on pages 287 to 486, from the mean places, given on pages 233 to 250. In order to render exact interpolation possible through intervals of ten days, all short period terms have been omitted.

[Eph 15]

FOR WASHINGTON MEAN MIDNIGHT.

Date.	$\delta''\psi$	$\delta''\omega$	Date.	$\delta''\psi$	$\delta''\omega$	Date.	$\delta''\psi$	$\delta''\omega$	Date.	$\delta''\psi$	$\delta''\omega$
	"	"		"	"		"	"		"	"
Jan. 0	+0.02	-0.10	Feb. 15	+0.11	+0.10	Apr. 1	-0.24	+0.02	May 17	+0.05	-0.08
1	0.10	0.07	16	0.00	0.10	2	0.21	-0.04	18	0.12	0.06
2	0.16	-0.04	17	-0.10	0.08	3	0.13	0.08	19	0.15	-0.02
3	0.18	+0.01	18	0.17	0.05	4	-0.02	0.11	20	0.14	+0.03
4	0.15	0.06	19	0.21	+0.01	5	+0.11	0.11	21	+0.09	0.07
5	+0.07	0.09	20	0.21	-0.03	6	0.22	0.08	22	0.00	0.10
6	-0.03	0.11	21	0.18	0.07	7	0.29	-0.04	23	-0.10	0.10
7	0.14	0.10	22	0.12	0.09	8	0.31	+0.01	24	0.20	0.09
8	0.23	0.07	23	-0.04	0.10	9	0.26	0.06	25	0.26	+0.05
9	0.27	+0.02	24	+0.05	0.09	10	0.18	0.09	26	0.27	0.00
10	-0.24	-0.04	25	+0.12	-0.06	11	+0.07	+0.10	27	-0.22	-0.05
11	0.17	0.08	26	0.17	-0.02	12	-0.04	0.09	28	0.12	0.09
12	-0.05	0.11	27	0.17	+0.03	13	0.13	0.07	29	-0.01	0.11
13	+0.09	0.11	28	0.13	0.07	14	0.19	+0.03	30	+0.15	0.10
14	0.20	0.08	Mar. 1	+0.05	0.10	15	0.24	-0.01	31	0.26	0.07
15	0.28	-0.04	2	-0.05	0.11	16	0.20	0.05	June 1	0.31*	-0.02
16	0.30	+0.01	3	0.15	0.09	17	0.15	0.08	2	0.31	+0.03
17	0.26	0.06	4	0.22	+0.05	18	0.09	0.10	3	0.26	0.07
18	0.19	0.09	5	0.24	0.00	19	-0.01	0.10	4	0.16	0.10
19	+0.08	0.10	6	0.20	-0.05	20	+0.07	0.08	5	+0.05	0.10
20	-0.02	+0.10	7	-0.11	-0.09	21	+0.12	-0.05	6	-0.05	+0.09
21	0.12	0.07	8	+0.02	0.11	22	0.15	0.00	7	0.13	0.06
22	0.18	+0.04	9	0.14	0.10	23	0.13	+0.04	8	0.18	+0.01
23	0.21	0.00	10	0.24	0.07	24	+0.07	0.08	9	0.19	-0.03
24	0.20	-0.04	11	0.29	-0.02	25	-0.02	0.10	10	0.16	0.06
25	0.16	0.08	12	0.29	+0.03	26	0.12	0.10	11	0.11	0.09
26	0.09	0.10	13	0.23	0.07	27	0.21	0.08	12	-0.03	0.10
27	-0.01	0.10	14	0.14	0.10	28	0.25	+0.03	13	+0.04	0.09
28	+0.08	0.08	15	+0.03	0.10	29	0.24	-0.02	14	0.11	0.07
29	0.15	-0.05	16	-0.07	0.09	30	0.18	0.07	15	0.15	-0.03
30	+0.18	0.00	17	-0.15	+0.06	May 1	-0.06	-0.10	16	+0.16	+0.02
31	0.17	+0.04	18	0.20	+0.02	2	+0.07	0.11	17	0.12	0.06
Feb. 1	0.11	0.08	19	0.21	-0.02	3	0.20	0.09	18	+0.04	0.09
2	+0.02	0.10	20	0.19	0.06	4	0.29	-0.05	19	-0.06	0.10
3	-0.09	0.10	21	0.14	0.09	5	0.32	0.00	20	0.17	0.09
4	0.19	0.08	22	-0.07	0.10	6	0.30	+0.05	21	0.25	0.06
5	0.25	+0.03	23	+0.02	0.09	7	0.22	0.08	22	0.29	+0.01
6	0.25	-0.02	24	0.09	0.07	8	0.12	0.10	23	0.26	-0.04
7	0.19	0.07	25	0.14	-0.03	9	+0.01	0.10	24	0.18	0.08
8	-0.08	0.10	26	0.16	+0.01	10	-0.09	0.08	25	-0.06	0.11
9	+0.05	-0.11	27	+0.13	+0.06	11	-0.16	+0.04	26	+0.08	-0.10
10	0.17	0.09	28	+0.06	0.09	12	0.20	0.00	27	0.20	0.08
11	0.25	0.05	29	-0.03	0.11	13	0.20	-0.04	28	0.29	-0.04
12	0.29	-0.01	30	0.13	0.10	14	0.16	0.07	29	0.31	+0.02
13	0.27	+0.04	31	0.21	0.06	15	0.10	0.09	30	0.27	0.06
14	0.20	0.08	Apr. 1	0.24	+0.02	16	-0.02	0.10	July 1	0.19	0.09
15	+0.11	+0.10	2	-0.21	-0.04	17	+0.05	-0.08	2	+0.09	+0.10

232 TERMS OF SHORT PERIOD IN THE NUTATION, 1

FOR WASHINGTON MEAN MIDNIGHT.

Date.	$\delta''\psi$	$\delta''\omega$	Date.	$\delta''\psi$	$\delta''\omega$	Date.	$\delta''\psi$	$\delta''\omega$	Date.	$\delta''\psi$
July 1	"	"	Aug. 16	"	"	Oct. 1	"	"	Nov. 16	"
2	+0.19	+0.09	17	-0.27	0.00	2	+0.10	-0.07	17	+0.03
3	+0.09	0.10	18	0.23	-0.05	3	0.14	-0.04	18	-0.07
4	-0.02	0.09	19	0.14	0.09	4	0.16	+0.01	19	0.14
5	0.11	0.07	20	-0.02	0.11	5	0.13	0.05	20	0.18
6	0.16	+0.03	21	+0.11	0.10	6	+0.07	0.08	21	0.17
7	0.18	-0.01	22	0.22	0.07	7	-0.02	0.10	22	0.14
8	0.16	0.05	23	0.27	-0.02	8	0.12	0.10	23	-0.07
9	0.12	0.08	24	0.27	+0.03	9	0.20	0.07	24	0.00
10	-0.05	0.10	25	0.22	0.08	10	0.25	+0.03	25	+0.07
	+0.03	0.09		0.13	0.10		0.25	-0.02		0.12
11	+0.10	-0.07	26	+0.03	+0.10	11	-0.19	-0.07	26	+0.15
12	0.15	-0.04	27	-0.07	0.08	12	-0.08	0.10	27	0.14
13	0.17	0.00	28	0.14	0.05	13	+0.05	0.11	28	0.10
14	0.15	+0.05	29	0.18	+0.01	14	0.17	0.09	29	+0.02
15	+0.08	0.08	30	0.18	-0.03	15	0.26	-0.05	30	-0.08
16	-0.02	0.10	31	0.15	0.07	16	0.30	0.00	Dec. 1	0.18
17	0.12	0.10	Sept. 1	0.09	0.09	17	0.27	+0.05	2	0.26
18	0.22	0.07	2	-0.02	0.10	18	0.20	0.09	3	0.29
19	0.28	+0.03	3	+0.06	0.09	19	+0.10	0.10	4	0.26
20	0.28	-0.02	4	0.12	0.06	20	-0.01	0.10	5	0.18
21	-0.22	-0.07	5	+0.16	-0.02	21	-0.11	+0.07	6	-0.06
22	-0.11	0.10	6	0.17	+0.02	22	0.17	+0.04	7	+0.08
23	+0.02	0.11	7	0.13	0.06	23	0.19	-0.01	8	0.21
24	0.15	0.09	8	+0.06	0.09	24	0.17	0.05	9	0.29
25	0.25	-0.05	9	-0.04	0.10	25	0.13	0.08	10	0.31
26	0.29	0.00	10	0.14	0.09	26	-0.06	0.09	11	0.27
27	0.27	+0.05	11	0.22	0.06	27	+0.01	0.09	12	0.19
28	0.21	0.08	12	0.26	+0.01	28	0.08	0.08	13	+0.08
29	0.11	0.10	13	0.24	-0.04	29	0.13	0.05	14	-0.03
30	+0.01	0.10	14	0.16	0.08	30	0.15	-0.01	15	0.11
31	-0.09	+0.08	15	-0.05	-0.11	31	+0.14	+0.03	16	-0.16
Aug. 1	0.15	+0.04	16	+0.08	0.10	Nov. 1	+0.08	0.07	17	0.17
2	0.18	0.00	17	0.19	0.08	2	0.00	0.10	18	0.14
3	0.17	-0.04	18	0.27	-0.03	3	-0.10	0.10	19	0.08
4	0.13	0.07	19	0.28	+0.02	4	0.19	0.08	20	-0.01
5	-0.07	0.09	20	0.24	0.06	5	0.26	+0.05	21	+0.06
6	+0.01	0.09	21	0.16	0.09	6	0.27	0.00	22	0.12
7	0.08	0.08	22	+0.05	0.10	7	0.22	-0.05	23	0.16
8	0.14	0.05	23	-0.05	0.09	8	-0.12	0.09	24	0.16
9	0.17	-0.01	24	0.13	0.06	9	+0.01	0.11	25	0.12
10	+0.16	+0.03	25	-0.18	+0.02	10	+0.14	-0.10	26	+0.06
11	0.11	0.07	26	0.19	-0.02	11	0.25	0.06	27	-0.04
12	+0.03	0.10	27	0.16	0.07	12	0.30	-0.02	28	0.15
13	-0.08	0.10	28	0.11	0.08	13	0.30	+0.03	29	0.24
14	0.18	0.09	29	-0.04	0.09	14	0.24	0.08	30	0.29
15	0.25	+0.05	30	+0.03	0.09	15	0.14	0.10	31	0.29
16	-0.27	0.00	Oct. 1	+0.10	-0.07	16	+0.03	+0.10	32	-0.23

WASHINGTON JANUARY 0^d. 732.

Name of Star.	Magni- tude.	Right Ascension.			Annual Variation.	Declination.			Annual Variation.
		h	m	s		°	'	"	
33 Piscium	4.7	0	0	59.112	+ 3.0714	- 6	10	59.04	+20.136
α Andromedæ (<i>Alpheratz</i>)	2.2	0	3	59.450	3.0960	+28	37	16.23	19.880
β Cassiopeia	2.4	0	4	38.056	3.1851	+58	40	51.55	19.861
ϵ Phœnicis	3.9	0	5	5.987	3.0512	-46	12	59.41	19.848
22 Andromedæ	5.1	0	5	53.898	3.1098	+45	35	57.38	20.034
γ Pegasi	2.9	0	8	51.420	+ 3.0865	+14	42	39.81	+20.021
σ Andromedæ	4.5	0	13	52.995	3.1276	+36	18	50.41	19.962
ι Ceti	3.8	0	15	5.845	3.0569	- 9	17	42.12	19.973
ζ Tucanæ	4.3	0	15	39.189	3.1477	-65	22	26.29	21.171
44 Piscium	6.0	0	21	2.687	3.0744	+ 1	28	8.31	19.938
β Hydri	2.9	0	21	18.226	+ 3.2000	-77	43	58.65	+20.277
α Phœnicis	2.4	0	22	5.172	2.9725	-42	46	3.30	19.550
12 Ceti	6.0	0	25	42.071	3.0622	- 4	25	36.49	19.919
13 Ceti	5.2	0	30	52.341	3.0871	- 4	3	38.03	19.847
ζ Cassiopeia	3.7	0	32	13.732	3.3288	+53	25	45.39	19.841
π Andromedæ	4.4	0	32	20.224	+ 3.1977	+33	15	5.76	+19.847
ϵ Andromedæ	4.5	0	34	3.624	3.1644	+28	51	1.40	19.571
δ Andromedæ	3.5	0	34	46.744	3.2021	+30	23	45.13	19.718
α Cassiopeia (<i>Schedir</i>) †	var.	0	35	40.497	3.3869	+56	4	16.87	19.771
μ Phœnicis	4.6	0	37	18.605	2.8393	-46	33	6.68	19.749
β Ceti	2.2	0	39	19.419	+ 3.0125	-18	27	10.44	+19.793
σ Cassiopeia	4.7	0	39	58.953	3.3314	+47	49	9.82	19.735
21 Cassiopeia	5.6	0	40	0.695	3.9060	+74	31	25.22	19.715
ζ Andromedæ	4.3	0	42	49.797	3.1748	+23	48	17.90	19.618
η Cassiopeia	3.6	0	43	56.963	3.6136	+57	21	57.15	19.202
δ Piscium	4.6	0	44	16.251	+ 3.1101	+ 7	7	21.73	+19.629
λ Hydri	5.0	0	45	39.057	2.1010	-75	23	8.87	19.649
20 Ceti	4.9	0	48	39.747	3.0642	- 1	36	19.65	19.592
γ Cassiopeia	2.2	0	51	34.034	3.5980	+60	15	24.17	19.535
μ Andromedæ	3.9	0	52	1.817	3.3211	+38	2	18.68	19.561
α Sculptoris	4.4	0	54	30.589	+ 2.8904	-29	49	0.63	+19.468
43 H. Cephei	4.5	0	56	54.030	7.6192	+85	48	6.45	19.427
ϵ Piscium	4.4	0	58	31.808	3.1112	+ 7	25	57.90	19.421
β Phœnicis	3.4	1	2	17.447	2.6798	-47	10	26.62	19.286
μ Cassiopeia	5.3	1	2	36.265	3.9699	+54	30	14.24	17.747
η Ceti	3.6	1	4	18.827	+ 3.0175	-10	37	56.92	+19.136
β Andromedæ	2.4	1	4	58.060	3.3508	+35	10	12.60	19.129
τ Piscium	4.7	1	6	58.496	3.2972	+29	38	19.22	19.167
ζ Piscium	5.6	1	9	17.333	3.1319	+ 7	7	34.20	19.084
* κ Tucanæ	5.0	1	12	53.231	2.0395	-69	19	39.52	19.129
f Piscium	5.3	1	13	24.803	+ 3.0926	+ 3	10	1.65	+19.000
v Piscium	4.7	1	14	47.437	3.2908	+26	49	3.41	18.979
θ Ceti	3.8	1	19	46.449	2.9978	- 8	37	17.93	18.629
δ Cassiopeia	2.8	1	20	14.640	3.9006	+59	47	38.69	18.793
γ Phœnicis	3.4	1	24	40.499	2.6076	-43	45	13.17	18.468
38 Cassiopeia	6.0	1	24	52.980	+ 4.4156	+69	49	39.72	+18.614
η Piscium	3.7	1	26	55.924	3.2059	+14	54	28.83	18.618
α Ursæ Min. (<i>Polaris</i>) †	2.1	1	29	15.60*	+28.5356	+88	51	6.49	+18.547

13 Ceti, dup. 5^m. 5, 6^m. 2, 0^m. 3
 ϵ Cassiop., var. irreg. 2^m. 2, 2^m. 8
 γ Cassiop. comp. 7^m. 6, 4^m. 5 s. pr.

β Phœnicis, dup. 4^m. 1, 4^m. 1, 1^m.
 ζ Piscium, star 6^m. 5, 24^m. n. f.

κ Tucanæ, comp. 7^m. 6^m. n.
 α Ursæ Min., star 9^m, 18^m s. pr.

WASHINGTON JANUARY 0^d.733.

Name of Star.	Magni- tude.	Right Ascension.			Annual Variation.	Declination.			v
		h	m	s	s	°	'	"	
40 Cassiopeiæ . . .	5.5	1	31	41.838	+4.7333	+72	36	26.78	
υ Andromedæ . . .	4.2	1	31	48.127	3.5100	+40	58	50.71	
π Piscium . . .	5.6	1	32	35.397	3.1766	+11	42	25.42	
υ Persei . . .	3.8	1	32	46.020	3.6676	+48	11	52.66	
α Eridani (<i>Achernar</i>)	0.6	1	34	32.979	2.2364	-57	40	6.31	
ω Cassiopeiæ . . .	5.5	1	36	1.604	+4.4015	+67	36	49.20	
ν Piscium . . .	4.7	1	37	0.378	3.1197	+ 5	3	28.40	
φ Persei . . .	4.2	1	38	19.473	3.7444	+50	15	39.68	
τ Ceti . . .	3.6	1	40	7.122	2.7866	-16	23	4.87	
ο Piscium . . .	4.5	1	40	54.186	3.1650	+ 8	43	49.10	
ε Sculptoris . . . †	5.4	1	41	39.682	+2.8046	-25	28	36.93	
4 Octantis (G.) . . .	5.6	1	42	9.88*	-3.7794	-85	11	57.70	
ζ Ceti . . .	3.9	1	47	15.863	+2.9601	-10	45	16.15	
α Trianguli . . .	3.6	1	48	13.918	3.4134	+29	9	54.88	
ε Cassiopeiæ . . .	3.4	1	48	15.916	4.2844	+63	15	7.54	
ξ Piscium . . .	4.8	1	49	9.215	+3.1038	+ 2	46	6.08	
β Arietis . . .	2.7	1	49	56.440	3.3083	+20	23	34.70	
ψ Phœnicis . . .	4.4	1	50	14.194	2.4036	-46	43	8.20	
υ Ceti . . .	4.2	1	55	59.966	2.8257	-21	29	21.17	
α Hydri . . .	3.0	1	56	5.081	1.8818	-61	58	59.49	
50 Cassiopeiæ . . .	4.1	1	56	8.901	+5.0610	+72	0	38.42	
γ Andromedæ <i>pr.</i> . .	2.3	1	58	40.520	3.6712	+41	55	20.73	
γ Andromedæ <i>seq.</i> . .	5.1	$\Delta\alpha + 0.890$			. . .	$\Delta\delta + 4.66$			
α Arietis . . .	2.2	2	2	22.676	3.3761	+23	3	39.78	
β Trianguli . . .	3.1	2	4	28.842	3.5615	+34	35	8.76	
55 Cassiopeiæ . . .	6.2	2	7	47.612	+4.6684	+66	7	36.26	
6 Persei . . .	5.4	2	7	56.608	3.9734	+50	40	17.60	
ξ ¹ Ceti . . .	4.5	2	8	29.556	3.1769	+ 8	26	54.17	
μ Fornacis . . .	5.2	2	9	9.631	2.6378	-31	7	20.88	
γ Trianguli . . .	4.1	2	12	15.373	3.5584	+33	27	16.74	
67 Ceti . . .	5.7	2	12	44.552	+2.9906	- 6	48	48.36	
φ Eridani . . .	3.8	2	13	28.273	2.1412	-51	54	19.30	
ο Ceti (<i>Mira</i>) †	<i>var.</i>	2	15	3.092	3.0291	- 3	21	46.70	
κ Fornacis . . .	5.4	2	18	39.156	2.7448	-24	12	8.11	
δ Hydri . . .	4.3	2	20	13.900	1.0584	-69	2	45.34	
ι Cassiopeiæ . . . †	4.6	2	22	2.701	+4.9029	+67	1	15.85	
ξ ² Ceti . . .	4.3	2	23	38.244	3.1864	+ 8	4	46.74	
σ Ceti . . .	4.8	2	28	3.433	2.8415	-15	37	1.26	
36 H. Cassiopeiæ . . .	5.3	2	29	55.347	5.6383	+72	26	50.86	
ν Ceti . . .	5.0	2	31	24.676	+3.1451	+ 5	13	22.74	
μ Hydri . . .	5.3	2	33	26.416	-1.3511	-79	28	49.47	
ν Arietis . . .	5.4	2	33	59.203	+3.4020	+21	35	39.96	
δ Ceti . . .	4.0	2	35	7.461	3.0731	- 0	2	15.01	
ε Hydri . . .	4.3	2	38	16.634	0.9138	-68	37	51.66	
θ Persei . . .	4.2	2	38	23.193	4.0833	+48	52	11.05	
γ Ceti <i>seq.</i> . . . †	3.7	2	38	53.664	+3.1059	+ 2	52	41.43	
π Ceti . . .	4.4	2	40	4.561	2.8537	-14	13	5.18	
μ Ceti . . .	4.4	2	40	20.674	+3.2394	+ 9	45	21.47	

* Sculptoris, comp. 9^m, 5^s n. f.° Ceti, var., 33^d, 1^m, 7-9^m.6, star 9^m f. 8^a† Cassiop., triple, 7^m, 8^m, 2^s, 8^mγ Ceti, comp. 6^m.2, 2^s, 7^m pr.

[Eph 15]

WASHINGTON, JANUARY 0^d. 732.

Name of Star.	Magni- tude.	Right Ascension.			Annual Variation.	Declination.			Annual Variation.
		h	m	s		°	'	"	
η Persei	† 3.9	2	44	29.228	+4.3576	+55	32	36.93	+15.089
41 Arietis	3.7	2	44	58.582	3.5248	+26	54	39.24	14.961
β Fornacis	4.5	2	45	31.992	2.5121	-32	45	44.94	15.196
σ Arietis	5.5	2	46	47.812	3.3080	+14	43	56.45	14.933
τ^2 Eridani	4.8	2	47	10.893	2.7200	-21	21	13.46	14.928
τ Persei	4.1	2	48	13.337	+4.2364	+52	24	55.69	+14.880
η Eridani	4.0	2	52	16.469	2.9302	-9	14	8.95	14.430
ϵ Arietis (<i>mean</i>)	† 4.6	2	54	20.884	3.4254	+21	0	3.66	14.510
47 H. Cephei	5.7	2	54	43.904	7.8484	+79	5	3.53	14.506
θ Eridani	† 3.4	2	55	2.411	2.2767	-40	38	41.34	14.502
α Ceti	2.8	2	57	50.056	+3.1332	+3	45	24.85	+14.230
γ Persei	3.1	2	58	37.879	4.3280	+53	10	28.24	14.254
τ^2 Eridani	4.2	2	58	38.655	2.6449	-23	57	25.18	14.214
ρ Persei	† var.	2	59	43.446	3.8353	+38	30	41.80	14.076
μ Horologii	5.2	3	1	36.362	1.4077	-60	4	0.91	14.021
θ Hydri	5.5	3	2	4.123	+0.1002	-72	14	3.81	+14.060
β Persei (<i>Algol</i>) † var.		3	2	37.936	3.8934	+40	37	44.41	14.009
δ Arietis	4.5	3	6	45.936	3.4261	+19	24	21.70	13.751
12 Eridani	† 4.0	3	8	27.562	2.5467	-29	19	18.00	14.278
48 H. Cephei	5.5	3	9	29.353	7.5006	+77	25	26.39	13.520
ζ Arietis	5.0	3	10	0.743	+3.4436	+20	43	48.35	+13.460
38 Horologii (G.)	† 5.7	3	10	23.763	1.5148	-57	38	22.62	13.511
ζ Eridani	4.9	3	11	42.203	2.9124	-9	8	5.10	13.486
τ Arietis	5.2	3	16	19.010	3.4593	+20	50	28.80	13.097
ϵ Eridani	4.3	3	16	31.960	+2.3980	-43	23	39.34	13.873
ι Hydri	5.5	3	18	3.138	-1.5535	-77	41	57.79	+13.055
α Persei	1.9	3	18	14.796	+4.2690	+49	33	34.51	12.974
σ Tauri	3.8	3	20	14.212	3.2254	+8	43	49.74	12.795
2 H. Camelopardalis	4.4	3	22	10.563	4.8372	+59	38	42.66	12.740
ξ Tauri	3.8	3	22	33.631	3.2484	+9	26	12.97	12.666
f Tauri	4.3	3	26	10.686	+3.3090	+12	38	46.18	+12.469
ϵ Eridani	† 3.8	3	28	55.491	2.8252	-9	44	42.81	12.304
τ^2 Eridani	4.3	3	30	1.905	2.6483	-21	55	2.76	12.162
δ Persei	3.1	3	36	51.984	4.2599	+47	31	0.31	11.685
δ Eridani	3.7	3	39	10.548	2.8730	-10	3	2.13	12.287
ν Persei	3.9	3	39	24.843	+4.0669	+42	18	39.87	+11.540
5 H. Camelopardalis	4.7	3	41	21.890	6.2840	+71	4	17.87	11.343
η Tauri (<i>Alcyone</i>) †	3.0	3	42	25.719	3.5616	+23	50	35.18	11.273
τ^2 Eridani	4.3	3	43	11.433	2.5806	-23	29	58.26	10.786
g Eridani	4.2	3	46	16.434	+2.2451	-36	27	24.91	11.016
γ Hydri	3.2	3	48	32.442	-0.9652	-74	29	58.93	+10.995
ζ Persei	2.9	3	48	47.105	+3.7656	+31	37	55.55	10.846
9 H. Camelopardalis	† 5.2	3	49	52.744	5.0940	+60	51	39.62	10.762
ϵ Persei	† 3.0	3	52	8.747	4.0192	+39	45	55.06	10.585
ξ Persei	4.0	3	53	26.756	3.8868	+35	32	50.68	10.498
γ Eridani	3.2	3	54	3.793	+2.7984	-13	44	58.63	+10.359
λ Tauri	† var.	3	55	58.159	3.3215	+12	15	3.56	10.315
δ Reticuli	4.4	3	57	23.686	+0.9409	-61	38	22.80	+10.217

γ Persei, star 5^m. 5, 28" n. pr.
 Arietis, dup., 5^m. 2, 5^m. 6, 1^m. 2
 θ Eridani, comp. 4^m. 4, 1^m. 8
 ρ Persei, var. irreg., 3^m. 4-4^m. 2

β Persei, var. 4^m. 87, 2^m. 1-3^m. 2
 12 Eridani, comp. 7^m. 1, 1^m. 4 n. pr.
 38 Horologii, remarkable purplish red star.
 ϵ Eridani, comp. 9^m. 2, 1^m

η Tauri, quad., comps. 6^m. 3, 7^m. 6, 8^m. 2, 11^m. 7, 18^m. 1, 190^m. 1
 9 H. Camelop., comp. 8^m. 1, 9 n. l.
 ϵ Persei, comp. 8^m. 6, 1^m. 6 n. l.
 λ Tauri, var., 3^m. 95, 3^m. 5-4^m. 2

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Name of Star.	Magni- tude.	Right Ascension.			Annual Variation.	Declination.			A Val
		h	m	s	s	°	'	"	
<i>v</i> Tauri	3.9	3	58	38.001	+ 3.1896	+ 5	45	15.28	+
<i>A</i> Tauri	4.5	3	59	40.052	3.5433	+21	51	1.99	
<i>c</i> Persei	4.0	4	2	29.150	4.3471	+47	29	11.80	
<i>p</i> Tauri	5.6	4	5	39.079	3.6492	+26	15	35.98	
<i>o</i> ¹ Eridani	4.1	4	7	42.934	2.9273	- 7	3	30.28	
Groombridge 750	6.7	4	9	27.362	+17.5817	+85	19	51.71	+
<i>μ</i> Tauri	4.3	4	10	55.033	3.2556	+ 8	40	49.08	
<i>α</i> Horologii	3.8	4	11	11.097	1.9874	-42	30	13.56	
<i>α</i> Reticuli	3.4	4	13	19.541	0.7650	-62	41	11.08	
<i>γ</i> Tauri	3.9	4	14	57.254	3.4116	+15	25	23.64	
<i>δ</i> Tauri	3.9	4	18	1.841	+ 3.4569	+17	20	38.52	+
<i>υ</i> ⁵ Eridani	4.1	4	20	50.633	2.2528	-34	12	49.46	
<i>ε</i> Tauri	3.6	4	23	39.084	+ 3.5007	+18	59	34.14	
<i>δ</i> Mensæ	5.6	4	23	41.271	- 4.1475	-80	24	50.32	
<i>m</i> Persei	6.1	4	27	25.825	+ 4.2151	+42	53	0.24	
<i>α</i> Tauri (<i>Aldebaran</i>)	1.1	4	31	2.478	+ 3.4400	+16	20	21.52	+
<i>v</i> Eridani	4.1	4	32	4.240	2.9958	- 3	31	31.42	
<i>α</i> Doradus	3.5	4	32	9.519	1.2947	-55	13	13.84	
53 Eridani	4.0	4	34	17.155	2.7455	-14	28	9.75	
<i>τ</i> Tauri	4.3	4	37	8.495	3.5986	+22	47	41.21	
Groombridge 848	6.0	4	37	22.320	+ 8.0196	+75	47	18.33	+
<i>α</i> Cæli	4.5	4	37	49.265	1.9300	-42	1	33.14	
4 Camelopardalis	5.4	4	40	55.036	4.9866	+56	36	27.09	
<i>μ</i> Eridani	4.2	4	41	15.094	2.9988	- 3	24	34.58	
<i>π</i> ³ Orionis	3.3	4	45	13.471	3.2551	+ 6	48	49.86	
9 Camelopardalis	4.4	4	45	35.540	+ 5.9481	+66	11	59.49	+
<i>i</i> Tauri	5.1	4	46	23.995	3.5076	+18	41	46.04	
<i>π</i> ⁵ Orionis	3.9	4	49	49.380	3.1240	+ 2	18	8.72	
<i>ι</i> Aurigæ	2.9	4	51	27.348	3.9038	+33	1	57.14	
<i>β</i> Camelopardalis	4.2	4	55	51.023	5.3257	+60	19	10.05	
<i>ε</i> Aurigæ	† var.	4	55	52.017	+ 4.3012	+43	41	55.08	+
<i>ζ</i> Aurigæ	3.9	4	56	32.023	4.1895	+40	57	10.53	
<i>ι</i> Tauri	4.7	4	58	0.837	3.5847	+21	28	9.83	
11 Orionis	4.6	4	59	42.650	3.4266	+15	17	11.96	
<i>η</i> Aurigæ	3.3	5	0	33.117	4.2041	+41	7	14.19	
<i>ε</i> Leporis	3.3	5	1	51.735	+ 2.5384	-22	29	4.16	+
<i>β</i> Eridani	2.9	5	3	40.249	2.9492	- 5	11	43.62	
<i>μ</i> Aurigæ	4.8	5	7	36.538	4.1017	+38	23	5.59	
19 H. Camelopardalis	5.2	5	8	31.512	9.8334	+79	8	10.01	
<i>μ</i> Leporis	3.3	5	9	6.773	2.6940	-16	18	19.23	
<i>α</i> Aurigæ (<i>Capella</i>)	0.2	5	10	24.448	+ 4.4287	+45	54	45.93	+
<i>β</i> Orionis (<i>Rigel</i>) †	0.3	5	10	27.127	2.8823	- 8	17	56.44	
<i>λ</i> Aurigæ	4.8	5	13	9.585	4.2176	+40	1	28.81	
<i>τ</i> Orionis	3.7	5	13	28.726	2.9125	- 6	56	7.54	
<i>ο</i> Columbæ	4.9	5	14	24.975	2.1588	-34	58	40.56	
<i>γ</i> Orionis (<i>Bellatrix</i>)	1.7	5	20	34.277	+ 3.2170	+ 6	16	24.75	+
<i>β</i> Tauri	1.8	5	20	55.053	3.7913	+28	32	12.08	
17 Camelopardalis	5.8	5	22	8.323	+ 5.6597	+62	59	51.64	+

A Tauri, star 6^m 5 f. 38", 270" s.
m Persei, star 6^m, 115" s. pr.*ε* Aurigæ, var. irreg., 3^m 0-4^m 5.*β* Orionis, comp. 8^m 0, 9^m 5 s. 1

[Rph 15]

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Name of Star.	Magni- tude.	Right Ascension.	Annual Variation.	Declination.	Annual Variation.
		h m s	s	° ' "	"
β Leporis	3.0	5 24 36.199	+ 2.5703	-20 49 35.17	+2.995
γ Aurigæ	4.9	5 27 11.663	3.9039	+32 7 48.64	2.846
δ Orionis	2.5	5 27 39.809	3.0643	- 0 21 40.31	2.816
Groombridge 966 . .	6.4	5 28 21.045	8.0088	+74 59 22.90	2.776
α Leporis	2.7	5 28 58.865	2.6457	-17 52 56.65	2.704
φ Orionis	4.5	5 30 9.193	+ 3.2926	+ 9 25 58.17	+2.588
ι Orionis	2.9	5 31 16.491	2.9342	- 5 57 53.66	2.504
ε Orionis	1.8	5 31 53.988	3.0435	- 1 15 19.10	2.453
ζ Tauri	3.0	5 32 33.850	3.5849	+21 5 29.69	2.362
Groombridge 944 . .	6.4	5 34 35.250	18.7618	+85 9 25.87	2.214
ζ Orionis	2.0	5 36 28.173	+ 3.0270	- 1 59 12.54	+2.041
α Columbae	2.8	5 36 34.264	2.1725	-34 7 8.00	2.007
ο Aurigæ	5.5	5 39 18.817	4.6452	+49 47 24.84	1.788
ζ Leporis	3.7	5 43 6.208	2.7179	-14 51 10.26	1.476
κ Orionis	2.2	5 43 43.496	2.8449	- 9 41 56.49	1.419
δ Doradus	4.5	5 44 37.108	+ 0.1021	-65 46 2.69	+1.344
ν Aurigæ	4.2	5 45 35.884	+ 4.1573	+39 7 29.15	1.272
31 Mensæ (G.) . .	6.2	5 46 38.12*	-11.6858	-84 49 49.43	1.255
δ Leporis	3.9	5 47 39.924	+ 2.5796	-20 53 7.97	0.429
α Orionis (Betelgeux) †	var.	5 50 34.187	3.2479	+ 7 23 31.66	0.834
δ Aurigæ	3.9	5 52 31.753	+ 4.9418	+54 16 46.62	+0.535
η Leporis	3.8	5 52 31.996	2.7323	-14 10 56.85	0.794
β Aurigæ	2.1	5 53 17.660	4.4018	+44 56 24.07	0.580
θ Aurigæ	2.7	5 53 55.502	4.0916	+37 12 27.69	+0.441
1 Geminorum . . .	4.3	5 58 57.210	3.6475	+23 16 7.88	-0.017
1 Puppis (G.) . .	6.2	6 2 1.631	+ 1.7258	-45 2 9.90	+0.047
ν Orionis	4.4	6 2 43.158	3.4264	+14 46 46.33	-0.263
22 H. Camelopardalis	4.7	6 9 28.988	6.6184	+69 21 5.37	0.943
η Geminorum . .	† var.	6 9 44.853	3.6227	+22 31 56.66	0.869
2 Lyncis	4.4	6 12 7.607	5.2985	+59 2 35.59	1.030
ζ Canis Majoris . .	3.1	6 17 2.925	+ 2.3018	-30 1 30.99	-1.513
μ Geminorum . .	3.2	6 17 49.125	3.6307	+22 33 29.65	1.671
φ ¹ Aurigæ	5.1	6 18 21.286	4.6260	+49 19 57.25	1.607
β Canis Majoris . .	2.0	6 18 57.372	2.6416	-17 54 46.37	1.652
8 Monocerotis . .	† 4.5	6 19 15.865	3.1802	+ 4 38 12.90	1.674
α Argūs (Canopus) .	-0.9	6 22 3.901	+ 1.3319	-52 38 56.20	-1.918
10 Monocerotis . .	5.0	6 23 45.790	2.9641	- 4 42 31.38	2.068
ν Geminorum . .	4.1	6 23 54.979	3.5629	+20 16 0.97	2.104
8 Lyncis	6.0	6 29 55.621	5.4921	+61 33 26.63	2.886
ε ² Canis Majoris . .	4.5	6 31 29.654	2.5157	-22 53 46.43	2.711
23 H. Camelopardalis	5.6	6 31 44.976	+10.2989	+79 39 32.76	-3.401
51 Aurigæ	5.7	6 32 46.215	4.1597	+39 28 0.74	2.969
γ Geminorum . .	1.9	6 32 48.129	3.4670	+16 28 21.89	2.907
ν Argūs	3.2	6 35 9.709	1.8367	-43 7 15.40	3.082
8 Monocerotis . .	† 4.7	6 36 17.836	3.3047	+ 9 58 30.86	3.170
ε Geminorum . .	3.2	6 38 42.204	+ 3.6928	+25 12 58.74	-3.387
ε Geminorum . .	3.4	6 40 31.160	3.3684	+12 59 17.48	3.718
φ ⁵ Aurigæ	5.3	6 40 36.961	+ 4.3298	+43 39 47.46	-3.374

4 Orionis, star 6^m.9, 52^s.6 n.
 Orionis, comp. 7^m.3, 11^s.5 s. f.
 Orionis, comp. 4^m.2, 2^s.4 s. f.

α Orionis, red star, var. irreg. 1^m.0-
 1^m.4.
 ε Aurigæ, comp. 7^m.5, 2^s.7, s. n. pr.
 1 Puppis, star, 5^m.8, 150^s.1 s. f.

η Gem., var. 231^d.4, 3^m.2-4^m.2, comp.
 8^m.8, 1^s.2 n. pr.
 8 Monoc., star 6^m.5, 13^s.7 n. l.
 S Monoc., comp. 8^m.8, 2^s.9 s. pr.

WASHINGTON, JANUARY $\phi^d.732$.

Name of Star.	Magni- tude.	Right Ascension.			Annual Variation.	Declination.			A ₁ Var
		h	m	s		°	'	"	
α Canis Majoris (<i>Sirius</i>) †	-1.6	6	41	24.147	+ 2.6434	-16	35	55.77	-
18 Monocerotis . . .	4.7	6	43	25.707	3.1281	+ 2	30	21.80	-
43 Camelopardalis . . .	5.1	6	44	32.874	+ 6.4884	+68	59	19.96	-
ζ Mensæ . . .	5.6	6	47	8.432	- 4.9417	-80	43	30.15	-
θ Geminorum . . .	3.6	6	47	11.329	+ 3.9582	+34	3	53.33	-
α Pictoris . . .	3.3	6	47	19.240	+ 0.6176	-61	51	0.16	-
τ Argûs . . .	2.8	6	47	49.608	1.4883	-50	30	47.80	-
15 Lyncis . . . †	4.5	6	49	55.390	5.2069	+58	32	8.08	-
θ Canis Majoris . . .	4.2	6	50	14.472	2.7879	-11	55	52.50	-
ε Canis Majoris . . . †	1.6	6	55	17.102	2.3574	-28	51	20.52	-
ζ Geminorum . . . †	var.	6	59	4.127	+ 3.5606	+20	41	45.29	-
ϕ^2 Canis Majoris . . .	3.1	6	59	28.510	2.5048	-23	42	30.00	-
γ Canis Majoris . . .	4.1	6	59	54.790	2.7148	-15	30	24.90	-
51 H. Cephei . . .	5.3	7	1	5.64*	29.2318	+87	11	5.45	-
δ Canis Majoris . . .	2.0	7	4	56.055	2.4381	-26	15	27.17	-
63 Aurigæ . . .	5.1	7	5	48.725	+ 4.1329	+39	27	37.06	-
51 Geminorum . . .	5.3	7	8	29.521	+ 3.4480	+16	18	14.88	-
γ^2 Volantis . . . †	3.9	7	9	28.283	- 0.5012	-70	21	39.88	-
λ Geminorum . . .	3.6	7	13	12.571	+ 3.4502	+16	41	40.50	-
25 H. Camelopardalis . . .	5.1	7	13	16.654	12.8254	+82	34	42.85	-
π Argûs . . .	2.7	7	14	8.442	+ 2.1189	-36	56	40.18	-
δ Geminorum . . . †	3.5	7	15	2.913	+ 3.5865	+22	8	23.28	-
δ Volantis . . .	4.0	7	16	52.998	- 0.0194	-67	48	6.13	-
7 Octantis (G.) . . .	6.4	7	17	0.79*	-20.2238	-86	53	53.55	-
ι Geminorum . . .	3.9	7	20	26.978	+ 3.7304	+27	58	4.77	-
η Canis Majoris . . .	2.4	7	20	44.023	+ 2.3738	-29	8	11.78	-
Groombridge 1308 . . .	5.8	7	22	2.963	6.2749	+68	38	27.05	-
β Canis Minoris . . .	3.1	7	22	32.538	3.2554	+ 8	27	41.16	-
ρ Geminorum . . .	4.2	7	23	38.789	3.8631	+31	57	16.89	-
σ Argûs . . . †	3.3	7	26	31.996	1.9016	-43	7	43.66	-
α^2 Geminorum (<i>Castor</i>)	2.0	7	29	10.736	+ 3.8332	+32	4	34.45	-
α^1 Geminorum . . .	2.8	$\Delta\alpha - 0.264$			. . . .	$\Delta\delta - 4.13$			.
25 Monocerotis . . .	5.2	7	33	3.100	2.9819	- 3	55	13.16	-
α Can. Min. . (<i>Procyon</i>) †	0.5	7	34	51.192	3.1421	+ 5	26	36.57	-
24 Lyncis . . .	5.0	7	35	49.392	5.0937	+58	54	37.89	-
κ Geminorum . . . †	3.7	7	39	19.122	+ 3.6265	+24	36	9.66	-
β Geminorum (<i>Pollux</i>)	1.2	7	40	7.018	3.6758	+28	13	56.71	-
4 Puppis . . .	5.1	7	42	2.035	2.7636	-14	21	23.32	-
ξ Argûs . . .	3.5	7	45	43.165	2.5232	-24	38	44.72	-
ϕ Geminorum . . .	5.0	7	48	17.882	3.6766	+26	59	12.46	-
26 Lyncis . . .	5.7	7	48	31.771	+ 4.3814	+47	47	9.69	-
Groombridge 1374 . . .	5.6	7	50	2.805	7.2441	+74	8	48.11	-
χ Argûs . . .	3.6	7	54	37.092	1.5259	-52	45	14.71	-
ω Cancri . . .	5.9	7	55	47.407	3.6339	+25	37	34.86	-
χ Geminorum . . .	5.0	7	58	18.059	3.6903	+28	2	0.52	-
27 Lyncis . . .	4.9	8	2	4.338	+ 4.5299	+51	45	10.18	-
ρ Argûs . . .	2.9	8	3	55.427	2.5546	-24	3	30.65	-
3 H. Ursæ Majoris . . .	5.5	8	4	22.221	+ 6.0120	+68	43	32.57	-

15 Lyncis, dup., $4^m.9$, $6^m.2$, $0''$, 7 .
 ε Can. Maj., comp. 9^m , $7''$, 8 s. f.
 ζ Gem., var., $10^m.15$, $3^m.7$ - $4^m.3$

γ^2 Volantis, comp. $5^m.8$, $12''$, 9 n. pr.
 δ Gem., comp. 8^m , $7''$, 0 s. pr.

σ Argûs, star. 8^m , $32''$, 4 n. f.
 κ Gem., comp. 8^m , 5 , $0''$, 6 s. pr.

Positions given for *Sirius* and *Procyon* are those of the centers of their orbits. Corrections given on 1 remain to be applied to reduce to the positions of the stars.

WASHINGTON JANUARY 0^d. 732.

Name of Star.	Magni- tude.	Right Ascension.			Annual Variation.	Declination.			Annual Variation.
		h	m	s	s	°	'	"	"
Argûs	† 2.2	8	6	54.847	+ 1.8498	-47	5	8.66	-10.553
Cancri (<i>mean</i>)	† 4.7	8	7	20.353	3.4445	+17	54	18.16	10.702
Bradley 1147	5.7	8	8	53.844	7.6207	+76	1	4.57	10.696
♂ Puppis	5.0	8	9	25.556	2.7580	-15	31	53.12	10.727
♂ Cancri	3.8	8	11	54.404	3.2557	+ 9	26	53.87	10.963
Groombridge 1119	7.0	8	13	47.916	+60.5580	+88	53	22.50	-11.032
♂ Lyncis	4.4	8	17	1.414	4.1209	+43	27	42.48	11.383
♂ Cancri	5.9	8	18	29.938	3.4391	+18	36	21.16	11.421
ε Argûs	1.7	8	20	46.247	1.2338	-59	14	8.47	11.545
♂ Monocerotis	4.0	8	21	24.869	+ 2.9996	- 3	37	42.18	11.618
♂ Chamæleontis	4.3	8	23	12.619	- 1.7472	-77	12	38.80	-11.709
♂ Ursæ Majoris	3.5	8	23	12.908	+ 5.0122	+61	0	12.47	11.839
Groombridge 1450	6.0	8	27	23.718	3.9092	+38	18	31.60	12.200
♂ Cancri	5.5	8	27	47.760	3.4744	+20	43	50.34	12.105
Groombridge 1446	6.3	8	30	17.206	6.7448	+73	55	41.20	12.340
♂ Hydræ	4.2	8	33	9.464	+ 3.1781	+ 6	0	3.19	-12.435
♂ Hydræ	4.5	8	34	18.967	3.1383	+ 3	38	26.23	12.513
γ Cancri	4.7	8	38	22.201	3.4769	+21	46	29.82	12.818
♂ Cancri	4.2	8	39	51.429	3.4138	+18	28	2.70	13.115
α Pyxidid	3.7	8	40	10.562	2.4110	-32	52	45.90	12.886
♂ Cancri	† 4.2	8	41	33.460	+ 3.6379	+29	4	17.68	-13.040
ε Hydræ	† 3.5	8	42	16.581	3.1797	+ 6	43	53.13	13.085
♂ Argûs	† 2.0	8	42	21.198	1.6517	-54	23	48.19	13.142
♂ Cancri (<i>mean</i>)	† 5.5	8	49	3.755	3.6680	+30	54	7.52	13.503
ζ Hydræ	3.3	8	50	54.154	3.1744	+ 6	16	11.00	13.594
♂ Ursæ Majoris	3.1	8	53	23.714	+ 4.1227	+48	22	34.26	-14.009
α Cancri	4.3	8	53	50.424	3.2846	+12	11	14.60	13.830
♂ Carinæ	† 5.1	8	54	53.563	1.4681	-58	54	3.91	13.874
κ Ursæ Majoris	3.7	8	57	49.777	4.1107	+47	29	36.53	14.106
♂ Ursæ Majoris	† 4.9	9	2	56.001	5.3221	+67	28	50.38	14.421
κ Cancri	5.1	9	3	8.719	+ 3.2527	+11	0	39.25	-14.380
λ Argûs	2.2	9	4	52.138	+ 2.2062	-43	5	20.84	14.479
ζ Octantis	5.4	9	9	14.21*	- 8.1212	-85	19	28.08	14.691
♂ Hydræ	3.8	9	9	56.613	+ 3.1236	+ 2	40	24.73	15.088
β Argûs	1.8	9	12	16.325	+ 0.6699	-69	22	1.19	14.819
♂ Cancri	6.6	9	14	14.425	+ 3.3536	+18	3	58.66	-15.164
♂ Argûs	2.2	9	14	48.782	1.6040	-58	55	5.45	15.054
♂ Lyncis	3.3	9	15	52.878	3.6635	+34	45	9.62	15.109
♂ Pyxidid	4.9	9	17	43.581	2.6514	-25	36	12.89	15.259
α Hydræ	2.2	9	23	24.653	2.9487	- 8	17	22.41	15.513
♂ Ursæ Majoris	3.8	9	24	50.659	+ 4.7652	+63	26	3.55	-15.600
♂ H. Draconis	4.6	9	25	4.133	8.8008	+81	42	12.85	15.664
♂ Ursæ Majoris	4.6	9	26	59.460	5.3602	+70	12	17.40	15.671
♂ Ursæ Majoris	3.3	9	27	10.855	4.0304	+52	3	55.70	16.295
♂ Argûs	† 3.6	9	27	20.963	2.3594	-40	5	40.03	15.723
ε Leonis	5.1	9	27	21.973	+ 3.2369	+11	40	36.59	-15.845
♂ Leonis Minoris	4.6	9	29	1.282	+ 3.6851	+36	46	32.30	15.872
ζ Chamæleontis	5.2	9	36	25.656	- 1.6513	-80	33	34.39	-16.220

Argûs, star 5^m. 49". 59. pr.Cancri, triple; binary 5^m. 6, 6^m. 3, 1"with comp. 6^m. 0, 5". 4 s. f.Cancri, star 6^m. 6, 30". 6 2. pr.♂ Hydræ, triple; binary 5^m. 5, 6^m. 8,♂ Argûs, with comp. 7^m. 8, 3". 3.♂ Argûs, comp. 5^m. 3, 5". 8.♂ Cancri, dup. 5^m. 9, 6^m. 4, 1". 4♂ Carinæ, comp. 7^m. 2, 5". 1.♂ Urs. Maj., binary 4^m. 9, 6^m. 1, 1". 3♂ Argûs, dup. 5^m. 8, 6^m. 0, 0". 2

[Eph 15]

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Name of Star.	Magni- tude.	Right Ascension.			Annual Variation.	Declination.			Ann Vari
		h	m	s	s	°	'	"	
o Leonis	3.8	9	36	36.960	+3.2050	+10	16	46.82	-16
θ Antliæ	5.0	9	40	24.734	2.6731	-27	22	47.43	16
ε Leonis	3.1	9	41	1.771	3.4110	+24	9	58.02	16
υ Ursæ Majoris	3.9	9	44	57.451	4.2921	+59	26	21.17	16
υ Argûs †	3.2	9	44	58.688	1.5008	-64	40	39.35	16
6 Sextantis	6.0	9	46	57.087	+3.0245	-3	50	40.00	-16
μ Leonis	4.1	9	47	55.921	3.4171	+26	24	28.24	16
Groombridge 1586 . . .	6.0	9	50	48.739	5.4305	+73	17	3.77	17
19 Leonis Minoris . . .	5.2	9	52	29.029	3.6850	+41	27	39.74	17
φ Argûs	3.7	9	53	52.556	2.1016	-54	9	46.90	17
π Leonis	4.9	9	55	43.375	+3.1722	+8	27	9.09	-17
η Leonis	3.6	10	2	41.951	3.2727	+17	10	39.51	17
α Leonis . (Regulus) .	1.3	10	3	50.825	3.1982	+12	22	59.05	17
λ Hydræ	3.8	10	6	26.654	2.9247	-11	56	0.44	17
ζ Velorum	4.1	10	11	9.860	2.5129	-41	42	1.69	17
32 Ursæ Majoris	5.7	10	11	52.653	+4.3934	+65	31	58.59	-17
ξ Leonis	3.6	10	11	57.954	3.3422	+23	50	28.88	17
λ Ursæ Majoris	3.5	10	11	58.636	3.6311	+43	20	21.76	17
γ Leonis pr. †	2.6	10	15	17.315	3.3116	+20	16	18.99	18
μ Ursæ Majoris	3.2	10	17	16.275	3.5859	+41	55	38.82	18
30 H. Ursæ Majoris . . .	4.9	10	18	1.440	+4.3620	+65	59	48.46	-18
30 H. Camelopardalis . .	5.3	10	20	49.679	7.5850	+82	59	30.46	18
μ Hydræ	4.1	10	21	58.735	2.9005	-16	24	7.03	18
31 Leonis Minoris . . .	4.4	10	22	58.420	3.4791	+37	8	35.19	18
α Antliæ	4.4	10	23	15.630	2.7424	-30	38	5.93	18
36 Ursæ Majoris	4.8	10	25	11.852	+3.8608	+56	25	0.55	-18
9 H. Draconis	5.0	10	27	54.385	5.1845	+76	9	4.96	18
ρ Leonis	3.8	10	28	20.236	3.1616	+9	44	39.87	18
33 Sextantis	6.4	10	37	4.733	3.0519	-1	17	39.07	18
41 Leonis Minoris . . .	5.0	10	38	47.842	3.2671	+23	38	1.50	18
θ Argûs	3.0	10	39	55.223	+2.1324	-63	56	57.98	-18
42 Leonis Minoris . . .	5.4	10	41	8.529	3.3425	+31	7	49.16	18
η Argûs †	var.	10	41	45.592	2.3208	-59	14	14.78	18
μ Argûs †	2.8	10	43	6.611	2.5736	-48	58	15.91	19
l Leonis	5.3	10	44	47.473	3.1564	+10	59	42.68	19
δ ² Chamæleontis . . . †	4.6	10	44	59.830	+0.5941	-80	5	30.67	-18
ν Hydræ	3.3	10	45	25.774	2.9582	-15	44	54.10	18
46 Leonis Minoris . . .	3.9	10	48	33.747	3.3635	+34	40	24.43	19
54 Leonis †	4.5	10	51	0.813	3.2530	+25	12	12.25	19
ι Antliæ	4.7	10	52	45.515	2.7960	-36	40	50.23	15
Groombridge 1706 . . .	6.3	10	53	11.477	+4.8888	+78	13	33.02	-19
α Crateris	4.2	10	55	37.895	2.9206	-17	50	45.95	19
d Leonis	5.0	10	56	10.282	3.0992	+4	4	26.68	19
β Ursæ Majoris	2.4	10	56	43.315	3.6407	+56	50	17.88	19
α Ursæ Majoris	2.0	10	58	29.677	+3.7286	+62	12	36.50	19
η Octantis	6.3	10	59	56.00*	-0.3564	-84	8	11.87	-19
χ Leonis	4.7	11	0	38.013	+3.0961	+7	47	45.22	19
ψ ¹ Leonis	5.7	11	2	34.123	+3.0613	+2	25	2.26	-19

υ Argûs, comp. 6^m.0, 4^m.9 s. f.
 γ Leonis, comp. 3^m.8, 3^m.7 s. f.

η Argûs, var., irreg., 1^m.6-6^m.6
 μ Argûs, comp. 7^m, 2^m.2 s. f.

δ² Chamæleontis, star 5^m.5 pr. 32^m.256^m.1
 54 Leonis, comp. 6^m.3, 6^m.4 s. f.

[Eph 15]

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Name of Star.	Magni- tude.	Right Ascension.			Annual Variation.	Declination.	Annual Variation.
		h	m	s	s	" ' "	"
ϕ Ursæ Majoris . . .	3.2	11	4	53.468	+3.3851	+44 57 35.81	-19.502
β Crateris . . .	4.5	11	7	28.530	2.9476	-22 21 42.15	19.628
δ Leonis . . .	2.6	11	9	35.433	3.1952	+20 59 22.42	19.703
θ Leonis . . .	3.4	11	9	46.859	3.1505	+15 53 39.62	19.651
γ Ursæ Majoris . . .	3.7	11	13	53.502	3.2480	+33 33 29.97	19.615
δ Crateris . . .	3.8	11	15	5.381	+2.9974	-14 19 6.26	-19.467
σ Leonis . . .	4.1	11	16	45.270	3.0950	+6 29 43.50	19.702
π Centauri . . .	4.3	11	17	7.546	2.7260	-54 1 30.24	19.709
ι Leonis . . . \dagger	4.0	11	19	29.634	3.1286	+10 59 51.30	19.817
τ Leonis . . .	5.2	11	23	33.984	3.0858	+3 19 28.29	19.809
λ Draconis . . .	4.1	11	26	22.439	+3.5964	+69 48 1.25	-19.851
ξ Hydræ . . .	3.7	11	28	49.112	2.9462	-31 23 14.19	19.915
λ Centauri . . .	3.3	11	31	51.141	2.7502	-62 32 58.03	19.921
ν Leonis . . .	4.5	11	32	35.798	3.0716	-0 21 15.61	19.863
π Chamæleontis . . .	5.7	11	33	44.826	2.4529	-75 25 33.58	19.937
ζ Draconis . . .	5.5	11	37	44.648	+3.3731	+67 12 55.43	-19.916
ζ Crateris . . .	4.9	11	40	27.154	3.0376	-17 52 41.26	20.014
χ Ursæ Majoris . . .	3.8	11	41	34.089	3.1801	+48 15 2.66	19.961
β Leonis (<i>Denebola</i>) . . .	2.2	11	44	43.528	3.0624	+15 2 50.16	20.119
β Virginis . . .	3.8	11	46	16.060	3.1252	+2 14 37.73	20.284
Groombridge 1830 . . .	6.5	11	48	5.075	+3.4677	+38 19 43.70	-25.802
γ Ursæ Majoris . . .	2.5	11	49	22.014	3.1700	+54 10 2.51	20.020
π Virginis . . .	4.6	11	56	31.032	3.0742	+7 5 17.87	20.075
α Virginis . . .	4.2	12	0	52.794	3.0570	+9 12 17.97	20.013
δ Centauri . . .	2.9	12	3	56.796	3.0952	-50 14 57.05	20.072
ϵ Corvi . . .	3.2	12	5	45.044	+3.0812	-22 8 49.52	-20.037
δ H. Draconis . . .	5.1	12	8	13.957	2.8477	+78 5 18.74	20.013
δ Crucis . . .	3.1	12	10	37.713	3.1749	-58 16 35.20	20.062
δ Ursæ Majoris . . .	3.4	12	11	13.649	2.9848	+57 30 17.54	20.016
γ Corvi . . .	2.8	12	11	25.941	3.0817	-17 4 11.83	20.004
ϵ Canum Venaticorum \dagger . . .	5.8	12	11	52.324	+3.0160	+41 7 59.40	-20.065
β Chamæleontis . . .	4.4	12	13	19.926	3.4477	-78 50 24.94	19.995
Bradley 1672 . . .	6.3	12	14	27.688	0.3615	+19 17 15.98	19.947
η Virginis . . .	4.0	12	15	33.429	3.0693	-0 11 40.25	20.027
α^1 Crucis . . .	1.6	12	21	51.556	3.3121	-62 37 41.44	19.994
α^2 Crucis . . .	2.1	$\Delta\alpha + 0.614$			. . . .	$\Delta\delta - 1.28$	. . . .
α Comæ . . .	5.7	12	25	27.180	+3.0183	+21 22 0.10	-19.958
δ Corvi . . . \dagger	3.1	12	25	27.862	3.1012	-16 2 32.34	20.070
γ Crucis . . . \dagger	1.6	12	26	26.420	3.3035	-56 38 13.90	20.173
δ Canum Venaticorum . . .	4.3	12	29	42.626	2.8564	+41 49 9.01	19.598
α Draconis . . .	3.9	12	29	51.770	+2.5776	+70 15 23.98	-19.866
β Corvi . . .	2.8	12	29	55.114	3.1454	-22 55 36.53	19.936
α Comæ <i>seq.</i> . . . \dagger	5.2	12	30	52.010	3.0107	+18 50 41.21	19.851
α Muscæ . . .	2.9	12	32	5.988	3.5415	-68 40 2.42	19.878
χ Virginis . . .	4.8	12	34	51.448	3.0937	-7 31 40.65	19.845
γ Centauri . . . \dagger	2.4	12	36	49.362	+3.2946	-48 29 35.47	-19.807
γ Virginis (<i>mean</i>) . . . \dagger	2.9	12	37	21.210	3.0398	-0 59 0.07	19.776
ρ Virginis . . .	5.0	12	37	34.974	+3.0372	+10 42 13.65	-19.883

ι Leonis, comp. $6^m.8$, $2^s.6$ n. l.
 δ Can. Ven., star $6^m.7$, $11^s.6$ s. pr.
 δ Corvi, star $6^m.24$, 4 s. pr.

γ Crucis, star $6^m.6$, 85^s n. l.
 α Comæ, star $6^m.7$, $20^s.6$ pr.
 γ Cent., dup., $3^m.1$, $3^s.1$, $1^s.7$

γ Virginis, binary, $3^m.7$, $3^s.7$, $6^s.2$,
 $P=328$

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Name of Star.	Magni- tude.	Right Ascension.			Annual Variation.	Declination.			An Vari
		h	m	s	s	°	'	"	
76 Ursæ Majoris . . .	5.9	12	37	51.390	+2.6314	+63	10	46.47	-1
β Crucis . . .	1.5	12	42	44.680	3.4823	-59	13	27.68	1
ι Octantis . . .	5.4	12	45	55.22*	5.9557	-84	39	43.10	:
31 Comæ . . .	5.1	12	47	33.559	2.9240	+28	0	10.80	:
32 H. Camelop. seq. . . †	5.3	12	48	29.536	0.4388	+83	52	29.63	:
η Centauri . . .	4.3	12	48	43.435	+3.3128	-39	43	0.51	-
ϵ Ursæ Majoris (<i>Alioth</i>) . . .	1.7	12	50	17.640	2.6482	+56	25	15.62	:
δ Virginis . . .	3.7	12	51	19.267	3.0208	+3	51	33.00	:
α Canum Venat. seq. . . †	2.9	12	52	3.235	2.8106	+38	46	37.95	:
δ Muscæ . . .	3.6	12	56	24.108	4.0726	-71	5	26.22	:
ϵ Virginis . . .	3.0	12	57	56.741	+2.9865	+11	24	56.75	-
θ Virginis . . . †	4.4	13	5	32.829	3.1032	-5	5	7.72	:
43 Comæ . . .	4.3	13	7	54.514	2.8025	+28	18	31.63	:
20 Canum Venaticorum . . .	4.7	13	13	44.057	2.6956	+41	1	11.61	:
γ Hydræ . . .	3.3	13	14	17.827	3.2555	-22	43	24.10	:
ι Centauri . . .	2.9	13	15	48.741	+3.3616	-36	15	51.30	-
ζ^1 Ursæ Maj. (<i>Mizar</i>) †	2.4	13	20	30.405	2.4221	+55	22	8.38	:
ζ^2 Ursæ Majoris . . .	4.0	$\Delta\alpha + 0.959$			. . . .	$\Delta\delta - 12.70$:
α Virginis (<i>Spica</i>) . . .	1.2	13	20	42.776	3.1570	-10	43	4.50	:
Groombridge 2001 . . .	6.1	13	23	57.867	1.5243	+72	49	57.36	:
70 Virginis . . .	5.2	13	24	16.359	+2.9340	+14	13	56.80	-
κ Octantis . . .	5.6	13	26	56.42*	9.0822	-85	21	4.95	:
ζ Virginis . . .	3.4	13	30	21.625	3.0545	-0	9	41.83	:
17 H. Canum Venaticorum . . .	5.0	13	31	0.209	2.6817	+37	37	3.52	:
ϵ Centauri . . .	2.6	13	34	29.567	3.7802	-53	2	5.10	:
m Virginis . . .	5.2	13	37	8.910	+3.1452	-8	16	28.09	-
τ Boötis . . .	4.5	13	43	13.369	2.8508	+17	52	47.83	:
η Ursæ Majoris (<i>Alkaid</i>) . . .	1.9	13	44	11.605	2.3680	+49	44	13.63	:
89 Virginis . . .	5.1	13	45	14.978	3.2541	-17	42	40.10	:
ζ Centauri . . .	3.1	13	50	13.771	3.7256	-46	52	13.73	:
η Boötis . . .	2.8	13	50	38.254	+2.8567	+18	49	24.20	-
θ Apodis . . . †	var.	13	57	0.213	5.7399	-76	23	13.79	:
τ Virginis . . .	4.3	13	57	19.165	3.0513	+1	57	19.56	:
11 Boötis . . .	6.1	13	57	19.286	2.7215	+27	47	47.97	:
β Centauri . . .	0.9	13	57	48.819	4.2058	-59	57	48.55	:
π Hydræ . . .	3.5	14	1	31.624	+3.4094	-26	16	24.30	-
θ Centauri . . .	2.3	14	1	40.478	3.5196	-35	57	8.22	:
α Draconis . . .	3.6	14	2	5.304	1.6244	+64	46	54.53	:
d Boötis . . .	4.8	14	6	31.390	2.7370	+25	29	37.59	:
κ Virginis . . .	4.3	14	8	21.561	+3.1968	-9	52	42.89	:
4 Ursæ Minoris . . .	5.0	14	9	9.611	-0.2816	+77	56	48.72	-
ι Virginis . . .	4.2	14	11	33.307	+3.1424	-5	35	43.30	:
α Boötis (<i>Arcturus</i>) . . .	0.2	14	11	47.030	2.7355	+19	37	28.04	:
λ Boötis . . .	4.3	14	13	9.239	2.2831	+46	28	41.47	:
δ Octantis . . .	4.1	14	13	9.28*	9.2466	-83	16	47.50	:
λ Virginis . . .	4.6	14	14	30.430	+3.2408	-12	58	49.37	-
2 Libræ . . .	6.3	14	18	51.030	3.2237	-11	19	34.81	:
θ Boötis . . .	4.1	14	22	18.243	+2.0433	+52	14	35.61	-

32 H. Cam. star 5^m.8, 21'' .6 n. pr.
 a Can. Ven. star 5^m, 19'' .8 s. pr.

θ Virginis, comp. 6^m, 7'' .1 n. pr.
 ζ^1 Urs. Maj., star Alcor 4^m.0, f. 79^a.2
 222'' n.

θ Apodis, var. irreg., 5^m.5-6^m.6

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Name of Star.	Magni- tude.	Right Ascension.			Annual Variation.	Declination.			Annual Variation.
		h	m	s	s	°	'	"	"
<i>f</i> Boötis	5.4	14	22	30.123	+ 2.7901	+19	36	30.67	-16.279
<i>φ</i> Virginis	5.0	14	23	49.280	+ 3.0889	- 1	50	50.69	16.230
<i>5</i> Ursæ Minoris	4.4	14	27	41.302	- 0.1627	+76	4	26.15	16.004
<i>ρ</i> Boötis	3.8	14	28	10.035	+ 2.5865	+30	44	38.50	15.887
<i>γ</i> Boötis	3.0	14	28	39.366	2.4172	+38	40	46.56	15.829
<i>η</i> Centauri	2.6	14	30	6.229	+ 3.7969	-41	47	6.06	-15.929
<i>σ</i> Boötis	4.5	14	30	58.810	2.6131	+30	6	50.05	15.726
<i>α</i> Centauri	0.1	14	33	48.941	4.0547	-60	29	6.76	14.974
<i>33</i> Boötis	5.4	14	35	40.501	2.2342	+44	46	14.81	15.640
<i>α</i> Apodis	3.8	14	37	14.370	7.2950	-78	41	6.42	15.534
<i>μ</i> Virginis	4.0	14	38	34.732	+ 3.1586	- 5	17	21.29	-15.758
<i>ε</i> Boötis	2.7	14	41	16.494	2.6203	+27	25	55.12	15.275
<i>109</i> Virginis	3.8	14	41	57.024	3.0312	+ 2	15	1.72	15.280
<i>8</i> Libræ	5.3	14	45	58.934	3.3132	-15	38	39.87	15.088
<i>α</i> Libræ	2.9	14	46	10.380	3.3138	-15	41	21.05	15.080
Groombridge 2164 . . .	5.7	14	49	16.884	+ 1.5202	+59	38	20.62	-14.704
<i>β</i> Ursæ Minoris	2.2	14	50	56.467	- 0.2046	+74	30	10.25	14.721
<i>ε</i> Libræ	5.6	14	52	9.179	+ 3.2505	-11	4	2.22	14.652
Piazzi 221	5.8	14	52	12.434	2.8297	+14	47	21.14	14.659
<i>β</i> Lupi	2.8	14	52	57.352	3.9131	-42	47	32.73	14.666
<i>δ</i> Libræ	<i>var.</i>	14	56	25.691	+ 3.2013	- 8	10	56.32	-14.409
<i>β</i> Boötis	3.6	14	58	44.662	2.2600	+40	43	31.03	14.292
<i>γ</i> Scorpii	3.4	14	59	5.502	3.5048	-24	56	54.64	14.278
<i>ψ</i> Boötis	4.7	15	0	48.194	2.5703	+27	16	42.50	14.138
<i>ε</i> Boötis	5.0	15	3	34.057	+ 2.6347	+25	11	58.37	14.136
Groombridge 2283 . . .	7.2	15	4	20.10*	-19.5312	+87	33	38.31	-13.873
<i>ζ</i> Lupi	3.5	15	6	10.234	+ 4.2917	-51	46	34.94	13.853
<i>1</i> Libræ	4.7	15	7	22.364	3.4142	-19	28	15.06	13.764
<i>γ</i> Trianguli Australis .	3.1	15	10	57.253	5.5527	-68	22	0.14	13.523
<i>3</i> Serpentis	5.4	15	10	57.747	2.9800	+ 5	15	15.36	13.485
<i>δ</i> Boötis	3.5	15	12	4.567	+ 2.4193	+33	37	52.65	-13.533
<i>β</i> Libræ	2.7	15	12	25.843	+ 3.2248	- 9	4	11.92	13.409
<i>γ</i> Ursæ Minoris	3.1	15	20	51.290	- 0.1157	+72	8	11.12	12.815
<i>μ</i> Boötis <i>pr.</i>	4.5	15	21	16.763	+ 2.2664	+37	40	28.94	12.718
<i>1</i> Serpentis	5.5	15	21	50.763	2.7800	+15	43	34.32	12.785
<i>1</i> Draconis	3.5	15	23	2.326	+ 1.3334	+59	15	48.31	-12.671
<i>32</i> Libræ	5.9	15	23	27.596	3.3787	-16	25	15.31	12.695
<i>ρ</i> Octantis	5.7	15	23	29.89*	13.3363	-84	11	5.28	12.569
<i>β</i> Coronæ Borealis . . .	3.7	15	24	19.475	2.4738	+29	23	53.12	12.515
<i>1</i> Boötis	5.2	15	27	52.571	2.1552	+41	7	20.07	12.364
<i>γ</i> Lupi (<i>mean</i>)	3.0	15	29	28.255	+ 3.9868	-40	52	55.46	-12.288
<i>γ</i> Libræ	4.0	15	30	46.151	3.3524	-14	30	24.03	12.143
<i>α</i> Coronæ Borealis . . .	2.3	15	31	5.313	2.5394	+27	0	0.25	12.227
<i>ζ</i> Coronæ Borealis <i>seq.</i> †	5.1	15	36	10.632	2.2596	+36	54	40.29	11.782
<i>α</i> Serpentis	2.8	15	40	4.796	2.9530	+ 6	41	32.38	11.449
<i>β</i> Serpentis	3.7	15	42	15.876	+ 2.7685	+15	41	13.45	-11.390
<i>κ</i> Serpentis	4.3	15	44	54.765	2.6995	+18	24	11.83	11.243
<i>μ</i> Serpentis	3.6	15	45	10.949	+ 3.1284	- 3	10	15.08	-11.151

* *Virginis*, comp. 9^m, 4^m.5 s. f.
 * *Boötis*, comp. 5^m.1, 2^m.8 n. pr.

† *Libræ*, var., 2^d.33, 4^m.8-6^m.2
 † *Boötis*, star 6^m.7, 108^m.8 s.

† *Lupi*, binary 3^m.7, 3^m.9, 6^m.4
 † *Cor. Bor.*, comp. 6^m.0, 6^m.2 n. pr.

* *Centauri*, dup., 0^m.3, 1^m.7; companion s. pr. The position given is that of the center of the center of gravity of the system.
 Corrections given on page ix remain to be applied to reduce to the position of α Centauri.

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Name of Star.	Magni- tude.	Right Ascension.			Annual Variation.	Declination.	An Vari
		h	m	s	s	° ' "	
12 H. Draconis . . .	5.1	15	45	22.054	+0.9072	+62 51 43.02	-1
ϵ Serpentis . . .	3.8	15	46	34.648	+2.9883	+ 4 43 58.75	1
ζ Ursæ Minoris . . .	4.3	15	47	4.094	-2.2036	+78 3 23.35	1
β Trianguli Australis . . .	3.0	15	47	38.490	+5.2572	-63 10 10.23	1
λ Libræ . . .	5.1	15	48	23.796	3.4774	-19 54 50.15	1
γ Serpentis . . .	3.9	15	52	31.567	+2.7697	+15 56 17.98	-
π Scorpii . . .	3.0	15	53	42.394	3.6238	-25 52 13.02	-
ϵ Coronæ Borealis . . .	4.2	15	54	4.044	2.4823	+27 7 23.97	-
δ Scorpii . . .	2.5	15	55	18.247	3.5423	-22 22 50.38	-
θ Draconis . . .	4.1	16	0	17.734	1.1217	+58 47 31.11	-
β Scorpii . . .	2.9	16	0	29.473	+3.4835	-19 34 24.98	-
κ Herculis . . .	5.3	16	4	14.227	2.7051	+17 16 20.89	-
Groombridge 2320 . . .	5.4	16	6	5.165	0.1528	+68 2 2.01	-
ϕ Herculis . . .	4.3	16	6	5.484	1.8898	+45 9 26.16	-
δ^1 Apodis . . .	4.8	16	7	36.008	8.8535	-78 29 1.45	-
δ Ophiuchi . . .	3.0	16	9	53.373	+3.1415	- 3 28 34.40	-
σ Coronæ Bor. seq. . .	5.8	16	11	29.697	+2.2458	+34 4 24.81	-
19 Ursæ Minoris . . .	5.5	16	13	13.911	-1.7483	+76 5 31.08	-
γ^2 Normæ . . .	4.1	16	13	28.249	+4.4721	-49 56 53.18	-
ϵ Ophiuchi . . .	3.3	16	13	49.326	3.1718	- 4 29 10.00	-
σ Scorpii . . .	3.1	16	16	1.137	+3.6416	-25 23 23.18	-
τ Herculis . . .	3.9	16	17	11.149	1.8031	+46 30 54.78	-
γ Herculis . . .	3.8	16	18	10.185	+2.6454	+19 21 7.03	-
η Ursæ Minoris . . .	5.0	16	19	58.320	-1.7905	+75 57 5.99	-
γ Apodis . . .	3.9	16	20	22.413	+9.1024	-78 42 30.41	-
ω Herculis . . .	4.5	16	21	29.321	+2.7618	+14 13 41.60	-
η Draconis . . .	2.9	16	22	50.274	0.8078	+61 42 22.83	-
α Scorpii . (Antares) . . .	1.2	16	24	11.574	3.6741	-26 14 39.44	-
β Herculis . . .	2.8	16	26	33.876	2.5774	+21 40 26.44	-
λ Ophiuchi . . .	3.8	16	26	37.506	+3.0239	+ 2 10 8.98	-
A Draconis . . .	5.0	16	28	8.583	-0.1297	+68 57 7.41	-
τ Scorpii . . .	2.9	16	30	35.282	+3.7296	-28 2 26.34	-
σ Herculis . . .	4.2	16	31	21.748	1.9335	+42 36 41.87	-
ζ Ophiuchi . . .	2.7	16	32	28.593	3.3008	-10 23 44.78	-
24 Scorpii . . .	5.0	16	36	39.286	3.4666	-17 34 42.54	-
ζ Herculis . . .	3.0	16	38	4.895	+2.2614	+31 45 22.12	-
α Trianguli Australis . . .	1.9	16	39	39.107	6.3235	-68 52 23.62	-
η Herculis . . .	3.6	16	39	58.872	2.0558	+39 4 59.66	-
Groombridge 2377 . . .	4.9	16	43	41.071	1.1373	+56 56 0.48	-
ϵ Scorpii . . .	2.4	16	44	39.268	3.8797	-34 8 24.25	-
49 Herculis . . .	6.4	16	48	12.623	+2.7302	+15 6 57.46	-
ϵ^1 Aræ . . .	4.2	16	52	48.206	4.7712	-53 1 52.35	-
κ Ophiuchi . . .	3.4	16	53	38.638	+2.8382	+ 9 30 22.86	-
ϵ Ursæ Minoris . . .	4.4	16	54	37.997	-6.2577	+82 10 44.05	-
30 Ophiuchi . . .	5.0	16	56	34.673	+3.1629	- 4 5 45.47	-
ϵ Herculis . . .	3.9	16	57	2.216	+2.2946	+31 3 3.13	-
d Herculis . . .	5.3	16	58	27.992	2.2120	+33 41 26.13	-
η Ophiuchi . . .	2.6	17	5	30.075	+3.4375	-15 37 13.99	-

 β Scorpii, comp. $5^m.1, 13''.3$ n. f. ϵ Herculis, star $6^m.5, 29''.7$ n. f. σ Cor. Bor., comp. $6^m.7, 4''.6$ s. pr. σ Scorpii, star $8^m, 21''$ pr. η Draconis, comp. $8^m, 5''.4$ s. f. α Scorpii, comp. $7^m, 3''.2$ pr. λ Ophiuchi, comp. $6^m, 1''.2$ n. ζ Herculis, binary, $3^m.0, 6^m.0,$ η Oph., binary, $3^m.5, 3^m.7, 0''.$

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Name of Star.	Magni- tude.	Right Ascension.			Annual Variation.	Declination.			Annual Variation.
		h	m	s		°	'	"	
η Scorpii	3.4	17	6	3.734	+ 4.2922	-43	7	42.20	-4.980
ζ Draconis	3.2	17	8	32.305	0.1690	+65	49	9.16	4.446
α Herculis	† var.	17	10	46.261	2.7345	+14	29	10.94	4.243
δ Herculis	† 3.2	17	11	32.370	2.4632	+24	56	19.33	4.365
π Herculis	3.4	17	12	5.139	2.0884	+36	54	15.46	4.161
δ Apodis (G.)	5.9	17	15	32.567	+11.1623	-80	46	58.79	-3.903
θ Ophiuchi	3.4	17	16	47.257	3.6818	-24	54	56.56	3.793
α Herculis	5.4	17	17	28.680	2.2430	+32	34	34.77	4.745
β Arae	2.8	17	18	13.862	4.9809	-55	27	2.48	3.660
δ Ophiuchi	4.3	17	21	10.626	3.6609	-24	5	53.66	3.517
σ Ophiuchi	4.4	17	22	17.802	+ 2.9756	+ 4	12	48.44	-3.275
δ Arae	3.8	17	23	25.226	5.4058	-60	36	52.45	3.306
α Arae	3.0	17	25	16.107	4.6328	-49	48	36.01	3.110
λ Herculis	4.5	17	27	18.174	2.4241	+26	10	26.42	2.832
λ Scorpii	1.7	17	27	50.090	4.0709	-37	2	33.95	2.832
β Draconis	3.0	17	28	30.684	+ 1.3542	+52	21	49.93	-2.737
α Ophiuchi	2.1	17	30	59.290	2.7838	+12	37	15.66	2.766
ϵ Serpentis	3.6	17	32	43.076	3.4329	-15	20	45.12	2.441
ι Herculis	3.8	17	37	3.939	1.6935	+46	3	3.81	2.000
η Pavonis	3.6	17	37	23.156	+ 5.8813	-64	41	4.97	2.055
α Draconis	4.9	17	37	26.848	- 0.3542	+68	47	50.32	-1.651
β Ophiuchi	2.9	17	39	16.387	+ 2.9629	+ 4	36	7.10	1.653
ι Scorpii	3.1	17	41	38.363	4.1947	-40	5	42.51	1.612
μ Herculis	3.5	17	43	7.878	+ 2.3470	+27	46	10.86	2.223
ψ Draconis	† 4.9	17	43	26.806	- 1.0742	+72	11	27.12	1.715
γ Ophiuchi	3.7	17	43	37.798	+ 3.0072	+ 2	44	18.38	-1.503
δ Herculis	5.5	17	51	59.469	2.4207	+26	3	46.13	0.695
ϵ Draconis	3.9	17	52	3.608	+ 1.0380	+56	53	8.48	0.618
γ Draconis	5.0	17	53	15.179	- 2.6902	+76	58	29.41	0.347
θ Herculis	4.0	17	53	20.263	+ 2.0570	+37	15	40.07	0.578
ν Ophiuchi	3.5	17	54	20.790	+ 3.3019	- 9	45	50.71	-0.614
ϵ Herculis	3.8	17	54	27.714	2.3315	+29	15	22.89	0.502
γ Draconis	2.4	17	54	37.932	1.3925	+51	29	54.34	0.494
δ Ophiuchi	3.9	17	56	23.292	+ 3.0049	+ 2	56	5.30	-0.329
δ Ursæ Minoris	4.4	17	59	40.30*	-19.4981	+86	36	51.19	+0.019
θ Arae	3.9	18	0	0.826	+ 4.6699	-50	5	54.70	-0.049
γ Sagittarii	3.1	18	0	20.778	3.8520	-30	25	34.24	0.168
γ Ophiuchi	† 4.1	18	1	9.496	3.0316	+ 2	31	5.91	-1.021
γ Ophiuchi	3.7	18	3	19.161	2.8433	+ 9	33	3.65	+0.377
α Herculis	3.8	18	4	13.580	2.3394	+28	45	0.20	0.372
χ Octantis	5.2	18	5	0.43*	+35.7348	-87	39	52.55	+0.312
μ Sagittarii	4.0	18	8	40.769	3.5870	-21	4	55.37	0.757
η Sagittarii	3.2	18	11	52.576	4.0597	-36	47	16.92	0.886
Groombridge 2533	5.4	18	13	0.119	1.8652	+42	7	47.25	1.135
δ Draconis	5.0	18	13	24.460	0.3456	+64	22	5.91	1.198
δ Sagittarii	2.8	18	15	33.142	+ 3.8406	-29	51	55.00	+1.326
η Serpentis	3.4	18	16	54.642	3.1028	- 2	55	18.03	0.786
ϵ Sagittarii	2.0	18	18	31.792	+ 3.9815	-34	25	32.56	+1.497

* Hercules, var. irreg., 5^m. 1-3^m. 9. dup.
comp. 6^m. 4^m. 6 s. l.

δ Herculis, binary, comp. 8^m. 12^m.
s. pr.

ψ Draconis, star 6^m. 1. 30^m. 4 s. l.
 γ Ophiuchi, comp. 6^m. 2^m. 1 s.

WASHINGTON JANUARY 0^d.73^m.

Name of Star.		Magni- tude.	Right Ascension.			Annual Variation.	Declination.			An Vari
			h	m	s	s	°	'	"	
109	Herculis	3.9	18	20	4.529	+ 2.5559	+21	43	48.57	+
α	Telescopii	3.8	18	20	40.265	+ 4.4500	-46	0	59.17	
χ	Draconis	3.7	18	22	35.509	- 1.0785	+72	41	46.21	
λ	Sagittarii	2.9	18	22	43.506	+ 3.7027	-25	28	11.22	
c	Serpentis	5.4	18	25	15.552	3.1215	- 2	2	28.12	
τ	Aquilæ	4.1	18	30	34.890	+ 3.2646	- 8	18	15.77	
ζ	Pavonis	4.1	18	33	6.395	7.0199	-71	30	9.66	
α	Lyræ (Vega)	0.1	18	34	3.632	2.0314	+38	42	14.11	
2	Aquilæ	4.7	18	37	37.244	3.2866	- 9	8	5.20	
ϕ	Sagittarii	3.3	18	40	20.767	3.7487	-27	4	44.82	
110	Herculis	4.3	18	42	0.160	+ 2.5803	+20	27	50.89	
6	Aquilæ	4.5	18	42	39.865	3.1829	- 4	50	22.95	
λ	Pavonis	4.4	18	44	20.655	5.5661	-62	17	10.72	
β	Lyræ †	var.	18	46	56.489	+ 2.2147	+33	15	47.96	
50	Draconis	5.4	18	49	7.425	- 1.9200	+75	20	2.48	
σ	Draconis †	4.8	18	49	56.954	+ 0.8881	+59	17	3.03	
σ	Sagittarii	2.1	18	49	59.674	3.7201	-26	24	12.19	
θ	Serpentis <i>pr.</i> †	4.5	18	51	59.617	2.9822	+ 4	5	31.68	
R	Lyræ †	var.	18	52	44.936	1.8260	+43	50	0.89	
γ	Lyræ	3.3	18	55	45.811	2.2435	+32	34	20.08	
ϵ	Aquilæ	4.2	18	55	45.857	+ 2.7221	+14	57	7.23	
ζ	Sagittarii †	2.7	18	57	12.248	3.8179	-30	0	10.14	
ζ	Aquilæ	3.0	19	1	30.184	2.7569	+13	44	10.69	
λ	Aquilæ	3.6	19	1	44.284	3.1836	- 5	0	38.72	
α	Coronæ Australis	4.1	19	3	41.391	4.0832	-38	2	17.11	
ι	Lyræ	5.1	19	4	16.137	+ 2.1412	+35	57	58.48	
π	Sagittarii	3.0	19	4	42.575	+ 3.5689	-21	9	34.72	
λ	Ursæ Minoris	6.6	19	5	3.27*	-71.5931	+89	0	51.13	
ψ	Sagittarii	4.9	19	10	19.768	+ 3.6802	-25	24	15.01	
δ	Draconis	3.2	19	12	32.370	0.0223	+67	30	43.19	
d	Sagittarii	5.0	19	12	39.736	+ 3.5110	-19	6	18.35	
θ	Lyræ	4.5	19	13	25.026	2.0808	+37	58	54.54	
ω	Aquilæ	5.1	19	13	49.604	2.8159	+11	26	28.76	
κ	Cygni	4.0	19	15	8.354	+ 1.3879	+53	12	40.35	
τ	Draconis	4.6	19	17	11.809	- 1.1356	+73	11	52.90	
δ	Aquilæ	3.4	19	21	12.769	+ 3.0249	+ 2	56	40.13	
σ	Octantis	5.5	19	24	31.66*	95.7707	-89	13	43.28	
β	Cygni †	3.2	19	27	17.588	2.4189	+27	46	49.51	
ι	Cygni	3.9	19	27	33.809	1.5133	+51	32	53.71	
μ	Aquilæ	4.6	19	29	56.251	2.9312	+ 7	11	52.05	
h	Sagittarii	4.7	19	31	32.153	+ 3.6531	-25	4	19.74	
κ	Aquilæ	5.0	19	32	19.180	3.2288	- 7	13	1.86	
θ	Cygni	4.6	19	34	9.746	1.6089	+50	1	25.54	
54	Sagittarii	5.4	19	35	51.289	3.4387	-16	29	20.51	
β	Sagittæ	4.4	19	37	13.855	2.6939	+17	16	42.23	
15	Cygni	5.0	19	41	12.705	+ 2.1640	+37	8	54.78	
f	Sagittarii	5.1	19	41	24.292	3.5015	-19	57	58.56	
γ	Aquilæ	2.8	19	42	13.113	+ 2.8520	+10	24	19.19	

β Lyræ, var., 12^d.9, 3^m.4-4^m.1, star 7^m, 46th s. f.

ϵ Draco, star 7^m.6, 32nd.1 n. pr.

θ Serpentis, star 5^m.4, 22nd.1 s. f.

R Lyræ, var., 46^d.4, 4^m.0-4^m.7

ζ Sag., binary, 3^m.4, 2^m.6, 0th.5

β Cygni, star 5^m.4, 34th.7 n. f.

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Name of Star.	Magni- tude.	Right Ascension.			Annual Variation.	Declination.			Annual Variation.
		h	m	s	s	°	'	"	"
δ Cygni	† 3.0	19 42	19.145		+1.8760	+44 55	21.83		+ 8.699
δ Sagittæ	3.8	19 43	35.865		2.6748	+18 19	26.06		8.773
α Aquilæ (Altair)	0.9	19 46	38.170		2.9271	+ 8 38	34.84		9.372
η Aquilæ	† var.	19 48	8.606		+3.0568	+ 0 47	12.13		9.104
ε Draconis	† 4.0	19 48	28.126		-0.1876	+70 3	5.07		9.164
τ Sagittarii	4.2	19 49	23.926		+4.1432	-42 5	33.21		+ 9.254
ε Pavonis	4.1	19 50	46.736		6.9873	-73 8	10.08		9.197
β Aquilæ	3.9	19 51	8.281		2.9468	+ 6 11	37.35		8.863
γ Sagittæ	3.7	19 54	58.596		2.6673	+19 15	38.11		9.665
ε Sagittarii	4.6	19 57	26.021		3.6929	-27 56	49.34		9.841
τ Aquilæ	5.6	19 59	59.274		+2.9308	+ 7 2	15.26		+10.051
θ Aquilæ	3.4	20 6	55.179		3.0960	- 1 4	27.58		10.548
ο Cygni seq.	† 4.0	20 10	57.352		+1.8901	+46 28	59.01		10.846
κ Cephei	† 4.4	20 11	46.465		-1.9653	+77 27	21.33		10.927
24 Vulpeculæ	5.4	20 13	8.874		+2.5673	+24 24	31.02		10.990
α Capricorni	† 3.8	20 13	20.385		+3.3304	-12 48	32.60		+11.024
β Capricorni	† 3.2	20 16	14.253		3.3734	-15 3	1.97		11.233
α Pavonis	2.1	20 18	55.811		4.7643	-57 0	30.54		11.329
γ Cygni	2.3	20 19	10.642		2.1526	+39 59	2.59		11.439
π Capricorni	† 5.2	20 22	27.442		3.4363	-18 29	27.63		11.671
ρ Capricorni	† 5.0	20 24	0.841		+3.4246	-18 5	43.55		+11.763
41 Cygni	4.1	20 25	55.395		+2.516	+30 5	3.65		11.916
θ Cephei	4.3	20 28	9.493		1.0117	+62 42	29.13		12.057
ε Delphini	4.0	20 29	9.144		+2.8664	+11 0	49.16		12.119
Groombridge 3241	6.4	20 30	23.002		-0.2387	+72 14	37.57		12.211
α Indi	3.2	20 31	35.501		+4.2298	-47 35	19.98		+12.366
β Delphini	† 3.7	20 33	33.826		2.8138	+14 17	55.61		12.414
ν Capricorni	5.3	20 35	12.769		3.4181	-18 26	18.57		12.555
α Delphini	3.9	20 35	41.414		2.7868	+15 36	42.38		12.611
β Pavonis	3.6	20 37	18.797		5.4432	-66 30	35.31		12.701
α Cygni (Deneb)	1.3	20 38	32.029		+2.0447	+44 58	33.82		+12.784
δ Delphini	4.5	20 39	29.443		2.8008	+14 46	7.98		12.801
ψ Capricorni	4.3	20 41	3.938		3.5566	-25 34	36.81		12.808
γ Delphini seq.	† 4.5	20 42	42.881		2.7832	+15 49	2.44		12.870
ε Cygni	2.6	20 42	46.314		2.4275	+33 39	4.68		13.396
ε Aquarii	3.8	20 43	4.555		+3.2493	- 9 48	27.29		+13.060
η Cephei	3.6	20 43	33.778		1.2245	+61 30	30.14		13.942
μ Aquarii	4.8	20 48	4.231		3.2378	- 9 18	10.94		13.379
β Indi	3.7	20 48	10.556		+4.7115	-58 46	31.82		13.416
76 Draconis	5.7	20 48	48.820		-4.1574	+82 13	2.89		13.491
32 Vulpeculæ	5.2	20 50	56.225		+2.5563	+27 44	1.69		+13.607
220 Draconis (Heis)	5.6	20 51	28.984		-2.6283	+80 14	3.12		13.613
ν Cygni	4.0	20 54	0.218		+2.2356	+40 50	21.60		13.781
α Octantis	5.2	20 54	27.658		7.3824	-77 20	58.34		13.438
γ Microscopii	4.7	20 56	4.887		3.6866	-32 35	26.42		13.926
θ Capricorni	4.2	21 1	10.251		+3.3754	-17 34	16.91		+14.180
ε Cygni	3.9	21 1	50.312		2.1813	+43 35	18.07		14.296
61 Cygni pr.	5.6	21 3	5.095		+2.6853	+38 19	50.90		+17.612

δ Cygni, comp. 8^m, 1^m.6 n. pr.
 η Aquilæ, var., 7^d.18, 3^m.7-4^m.4
 ε Draconis, comp. 7^m.6, 3^m.1 n.
 ο Cygni, star 5^m.0 pr. 19^d, 270^d n., star
 7^m.81, 1^m.96^d s.

κ Cephei, comp. 8^m, 7^m.5 s. f.
 α² Capricor., α¹ Capricor. 4^m.6 pr. 24^d,
 137^m n.
 β Capricor., star 6^m.s pr. 14^d, 10^m s.

π Capricor., comp. 9^m, 3^m.4 s. f.
 ρ Capricor., comp. 7^m.6, 2^m.8 s.
 β Delphini, binary 4^m.1, 5^m.4, 0^m.5
 γ Delphini, comp. 5^m.5, 1^m.1 s. pr.

WASHINGTON, JANUARY 0^d.73^a.

Name of Star.	Magni- tude.	Right Ascension.	Annual Variation.	Declination.	Ann Varia
		h m s	s	° ' "	
61 Cygni <i>seq.</i>	6.3	$\Delta\alpha + 1.553$	...	$\Delta\delta - 16.26$	.
γ Aquarii	4.5	21 4 57.907	+ 3.2700	-11 42 58.97	+1.
Bradley 2777	5.9	21 7 13.487	- 1.1414	+77 46 54.83	1
3 Piscis Australis	5.6	21 8 15.080	+ 3.5634	-27 57 59.99	1
ζ Cygni	3.4	21 9 19.072	2.5521	+29 52 39.67	1
τ Cygni	3.8 [†]	21 11 23.848	+ 2.3940	+37 40 55.52	+1
α Equulei	4.1	21 11 34.507	2.9992	+ 4 53 45.02	1
σ Cygni	4.3	21 14 4.592	2.3548	+39 2 17.08	1
θ Microscopii	4.9	21 15 19.599	3.8447	-41 10 10.24	1
α Cephei	2.6	21 16 33.153	1.4349	+62 13 30.51	1
ι Capricorni	4.3	21 17 30.963	+ 3.3441	-17 11 49.76	+1
ι Pegasi	4.2	21 18 9.316	2.7741	+19 26 25.06	1
γ Pavonis	4.3	21 19 25.871	5.0008	-65 45 6.49	1
ζ Capricorni	3.9	21 21 49.032	3.4303	-22 46 48.36	1
g Cygni	5.3 [†]	21 26 18.716	2.2127	+46 9 55.50	1
β Aquarii	3.1	21 27 5.123	+ 3.1599	- 5 56 44.59	+1
β Cephei	3.3 [†]	21 27 34.161	0.7860	+70 11 14.66	1
ξ Aquarii	4.8	21 33 13.698	3.1957	- 8 14 9.39	1
74 Cygni	5.1	21 33 32.484	2.4034	+40 1 52.30	1
γ Capricorni	3.8	21 35 23.022	3.3272	-17 2 48.24	1
λ Octantis	5.4 [†]	21 38 0.495	+ 9.5345	-83 6 39.62	+1
ϵ Pegasi	2.5	21 40 0.661	2.9461	+ 9 29 5.14	1
11 Cephei	4.8	21 40 40.840	0.8881	+70 55 11.41	1
δ Capricorni	3.0	21 42 21.070	3.3141	-16 30 48.75	1
π^2 Cygni	4.3	21 43 39.110	2.2145	+48 54 57.23	1
μ Capricorni	5.2	21 48 39.795	+ 3.2730	-13 57 9.12	+
γ Gruis	3.2	21 48 47.133	3.6412	-37 45 54.84	1
16 Pegasi	5.0	21 49 11.625	2.7284	+25 31 29.46	1
79 Draconis	6.6	21 51 47.810	0.7188	+73 17 59.98	1
ϵ Indi	4.7	21 56 51.886	4.6096	-57 8 8.91	1
20 Pegasi	5.7	21 56 56.871	+ 2.9222	+12 42 44.19	+
α Aquarii	3.2	22 1 25.131	3.0820	- 0 43 59.46	1
ι Aquarii	4.4	22 1 50.877	3.2425	-14 16 57.16	1
20 Cephei	5.4	22 2 25.475	1.8227	+62 22 14.15	1
α Gruis	2.2	22 2 52.890	3.7937	-47 22 24.06	1
ι Pegasi	4.0	22 3 3.194	+ 2.7915	+24 55 46.17	+
θ Pegasi	3.7	22 5 54.752	3.0267	+ 5 46 45.54	1
π Pegasi	4.4	22 6 12.671	2.6627	+32 45 38.64	1
ζ Cephei	3.6	22 7 54.209	2.0781	+57 46 55.24	1
24 Cephei	5.0	22 8 10.570	1.1577	+71 55 20.20	1
θ Aquarii	4.3	22 12 20.960	+ 3.1672	- 8 12 24.85	+
α Tucanæ	2.9	22 12 41.227	4.1348	-60 41 0.76	1
ν Octantis	5.7	22 15 43.98*	12.3687	-86 24 3.31	1
γ Aquarii	4.0	22 17 15.987	3.0991	- 1 48 57.39	1
31 Pegasi	4.9	22 17 20.054	2.9530	+11 46 35.35	1
3 Lacertæ	4.6	22 20 12.924	+ 2.3556	+51 48 10.39	+
π Aquarii	4.6	22 20 56.163	3.0638	+ 0 56 44.29	1
σ Aquarii	4.9	22 26 9.036	+ 3.1771	-11 6 47.60	+

 τ Cygni, comp. γ^m , 0".8 ξ Cygni, star 6^m.7 f. 10^s, 420" s. β Cephei, star 8^m, 13".3 s. pr. λ Octantis, binary, 5^m.5, 8^m.5

WASHINGTON JANUARY 0^d.732.

Name of Star.	Magni- tude.	Right Ascension.			Annual Variation.	Declination.			Annual Variation.
		h	m	s		°	'	"	
α Lacertæ	3.8	22	27	47.263	+2.4680	+49	50	42.51	+18.458
ν Aquarii	5.3	22	30	2.730	3.2851	-21	8	38.83	18.367
226 B. Cephei	5.7	22	30	47.103	1.0648	+75	47	17.92	18.546
η Aquarii	4.1	22	30	59.337	3.0832	-0	33	21.30	18.500
10 Lacertæ	4.9	22	35	26.725	2.6889	+38	36	27.07	18.685
ϵ Piscis Australis . .	4.2	22	35	57.401	+3.3227	-27	29	14.91	+18.702
ζ Pegasi	3.6	22	37	13.343	2.9914	+10	23	14.19	18.738
β Octantis	4.3	22	37	26.383	6.3226	-81	49	39.87	18.761
β Gruis	2.2	22	37	35.848	3.5960	-47	19	46.45	18.737
η Pegasi	3.1	22	39	0.947	2.8092	+29	46	34.51	18.770
λ Pegasi	4.1	22	42	26.109	+2.8869	+23	7	4.97	+18.899
ϵ Gruis	3.7	22	43	25.560	3.6381	-51	45	50.53	18.878
τ Aquarii	4.2	22	45	5.599	3.1791	-14	2	29.33	18.952
μ Pegasi	3.7	22	45	53.962	2.8932	+24	9	8.89	18.965
ι Cephei	3.7	22	46	39.052	2.1281	+65	45	11.17	18.902
λ Aquarii	3.8	22	48	10.851	+3.1309	-8	1	55.91	+19.104
ρ Indi	6.1	22	48	45.522	4.2154	-70	31	41.31	19.138
δ Aquarii	3.5	22	50	8.435	3.1863	-16	16	23.30	19.096
α Pisc. Aust. (<i>Fomalhaut</i>)	1.3	22	52	57.408	3.3209	-30	4	23.03	19.023
σ Andromedæ	3.6	22	58	0.406	2.7546	+41	52	8.08	19.307
β Pegasi	† var.	22	59	39.097	+2.9052	+27	37	17.25	+19.490
α Pegasi (<i>Markab</i>)	2.6	23	0	31.530	2.9864	+14	44	51.74	19.335
55 Pegasi	4.7	23	2	43.301	3.0209	+8	57	0.14	19.411
ϵ^2 Aquarii	3.8	23	4	54.972	3.2020	-21	38	2.67	19.510
π Cephei	† 4.6	23	5	11.435	1.8994	+74	55	40.18	19.443
ι Gruis	4.1	23	5	33.109	+3.4071	-45	42	26.60	+19.452
59 Pegasi	5.2	23	7	26.665	3.0278	+8	15	30.12	19.525
5 Cassiopeiæ (<i>Heis</i>) . .	5.6	23	9	11.138	2.8787	+56	41	56.28	19.853
ϕ Aquarii	4.4	23	9	55.235	3.1072	-6	30	26.81	19.374
ψ Aquarii	† 4.5	23	11	26.377	3.1448	-9	33	3.17	19.592
γ Tucanæ	4.1	23	12	28.514	+3.5195	-58	42	8.12	+19.676
γ Piscium	3.8	23	12	45.512	3.1094	+2	49	3.66	19.642
γ Sculptoris	4.5	23	14	14.195	3.2449	-32	59	43.05	19.581
σ Cephei	† 4.9	23	15	7.766	2.4517	+67	38	46.70	19.680
τ Pegasi	4.6	23	16	25.654	2.9658	+23	16	29.52	19.673
δ Aquarii	4.2	23	18	30.455	+3.1530	-20	33	53.33	+19.628
4 Cassiopeiæ	5.2	23	21	3.291	2.6504	+61	48	57.70	19.747
ν Pegasi	4.6	23	21	8.086	2.9906	+22	56	9.35	19.788
κ Piscium	4.9	23	22	34.509	3.0752	+0	47	24.69	19.686
θ Piscium	4.4	23	23	39.334	3.0420	+5	54	43.24	19.753
70 Pegasi	4.7	23	24	51.274	+3.0321	+12	17	29.41	+19.846
39 H. Cephei	5.6	23	27	44.653	-0.2579	+86	50	19.16	19.867
β Sculptoris	4.5	23	28	25.007	+3.2247	-38	17	19.13	19.861
72 Pegasi (<i>mean</i>)	† 5.2	23	29	43.986	2.9709	+30	51	22.14	19.862
λ Andromedæ	4.0	23	33	23.972	2.9282	+45	59	51.23	19.491
ι Andromedæ	4.3	23	33	57.797	+2.9348	+42	47	50.73	+19.916
ι Piscium	4.3	23	35	34.656	3.0844	+5	9	55.78	19.496
γ Cephei	3.4	23	35	50.979	+2.4387	+77	9	28.64	+20.092

β Pegasi, var. irreg., $2^m.9-2^m.7$
 σ Cephei, comp. $2^m.0-2^m.9$ f.

ϕ Aquarii, star $8^m.40''-4$ n. pr.
 σ Cephei, comp. $8^m.2''-9$ s. pr.

72 Pegasi, $6^m.0, 6^m.0, 0''-4$

WASHINGTON, JANUARY 0^d. 732.

Name of Star.	Magni- tude	Right Ascension.			Annual Variation.	Declination.			Annual Variation.
		h	m	s		°	'	"	
κ Andromedæ . . .	4.3	23	36	13.039	+ 2.9474	+43	51	47.31	+19.913
ω ² Aquarii . . .	4.6	23	38	18.918	3.1127	-15	0	53.55	19.893
ι ¹ Aquarii . . .	5.3	23	39	47.668	3.1145	-18	44	55.85	19.962
ψ Andromedæ . . .	5.1	23	41	49.039	2.9637	+45	56	53.64	19.975
41 H. Cephei . . .	5.0	23	43	50.271	2.8495	+67	20	3.92	19.986
δ Sculptoris . . .	4.6	23	44	29.985	+ 3.1278	-28	36	2.61	+19.867
γ ¹ Octantis . . .	5.1	23	47	9.199	3.6160	-82	29	28.43	20.002
φ Pegasi . . .	5.2	23	48	9.684	3.0480	+18	38	53.44	19.980
ρ Cassiopeiæ . . .	4.8	23	50	7.747	2.9817	+57	1	35.42	20.028
Groombridge 4163 . . .	6.6	23	50	40.703	2.8799	+73	56	14.18	20.024
ω Piscium . . .	4.0	23	54	56.738	+ 3.0795	+ 6	23	34.05	+19.933
ε Tucanæ . . .	4.7	23	55	30.465	3.1392	-66	2	59.09	20.034
30 Piscium . . .	4.7	23	57	36.059	3.0772	- 6	29	11.22	20.007
2 Ceti . . .	4.6	23	59	23.188	+ 3.0752	-17	48	33.28	+20.032

NORTHERN CIRCUMPOLARS.

43 H. Cephei . . .	4.5	0	56	54.030	+ 7.6192	+85	48	6.45	+19.427
α Ursæ Minoris (<i>Polaris</i>) . . .	2.1	1	29	15.60*	28.5356	+88	51	6.49	18.547
Groombridge 750 . . .	6.7	4	9	27.362	17.5817	+85	19	51.71	9.341
Groombridge 944 . . .	6.4	5	34	35.250	18.7618	+85	9	25.87	+ 2.214
51 H. Cephei . . .	5.3	7	1	5.64*	29.2318	+87	11	5.45	- 5.315
Groombridge 1119 . . .	7.0	8	13	47.916	+60.5580	+88	53	22.50	-11.032
1 H. Draconis . . .	4.6	9	25	4.133	8.8008	+81	42	12.85	15.664
30 H. Camelopardalis . . .	5.3	10	20	49.679	7.5850	+82	59	30.46	18.189
Bradley 1672 . . .	6.3	12	14	27.688	+ 0.3615	+88	10	15.98	19.947
Groombridge 2283 . . .	7.2	15	4	20.10*	-19.5312	+87	33	38.31	13.873
ε Ursæ Minoris . . .	4.4	16	54	37.997	- 6.2577	+82	10	44.05	- 5.641
δ Ursæ Minoris . . .	4.4	17	59	40.30*	19.4981	+86	36	51.19	+ 0.019
λ Ursæ Minoris . . .	6.6	19	5	3.27*	71.5931	+89	0	51.13	5.620
76 Draconis . . .	5.7	20	48	48.820	4.1574	+82	13	2.89	13.491
39 H. Cephei . . .	5.6	23	27	44.653	- 0.2579	+86	50	19.16	+19.867

SOUTHERN CIRCUMPOLARS.

4 Octantis (G.) . . .	5.6	1	42	9.88*	- 3.7794	-85	11	57.70	+18.114
31 Mensæ (G.) . . .	6.2	5	46	38.12*	11.6858	-84	49	49.43	+ 1.255
7 Octantis (G.) . . .	6.4	7	17	0.79*	20.2238	-86	53	53.55	- 6.604
ζ Octantis . . .	5.4	9	9	14.21*	8.1212	-85	19	28.08	14.691
η Octantis . . .	6.3	10	59	56.00*	- 0.3564	-84	8	11.87	19.366
ι Octantis . . .	5.4	12	45	55.22*	+ 5.9557	-84	39	43.10	-19.621
δ Octantis . . .	4.1	14	13	9.28*	9.2466	-83	16	47.50	-16.771
χ Octantis . . .	5.2	18	5	0.43*	35.7348	-87	39	52.55	+ 0.312
σ Octantis . . .	5.5	19	24	31.66*	95.7707	-89	13	43.28	7.226
υ Octantis . . .	5.7	22	15	43.98*	+12.3687	-86	24	3.31	+18.081

[Eph 15]

APPARENT PLACES OF CIRCUMPOLAR STARS
FOR THE UPPER TRANSIT AT WASHINGTON.

43 H. Cephei. Mag. 4.5			α Ursæ Minoris. (Polaris.) Mag. 2.1			Groombridge 750. Mag. 6.7			Groombridge 944. Mag. 6.4			51 H. Cephei. Mag. 5.3		
Mean Solar Date.	Right Ascension.	Declination North.	Mean Solar Date.	Right Ascension.	Declination North.	Mean Solar Date.	Right Ascension.	Declination North.	Mean Solar Date.	Right Ascension.	Declination North.	Mean Solar Date.	Right Ascension.	Declination North.
Jan.	h m 0 56	° ' " +85 48	Jan.	h m 1 28	° ' " +88 51	Jan.	h m 4 9	° ' " +85 20	Jan.	h m 5 34	° ' " +85 9	Jan.	h m 7 1	° ' " +87 11
0.3	50.82	31.88	0.3	74.39	32.38	0.4	41.25	11.77	0.5	53.58	38.68	0.5	41.08	9.11
1.3	50.53	32.01	1.3	73.39	32.55	1.4	41.17	12.10	1.5	53.60	39.02	1.5	41.28	9.43
2.3	50.22	32.12	2.3	72.33	32.72	2.4	41.07	12.42	2.5	53.59	39.38	2.5	41.47	9.78
3.3	49.89	32.21	3.3	71.19	32.88	3.4	40.94	12.74	3.4	53.58	39.74	3.5	41.62	10.14
4.3	49.57	32.28	4.3	70.02	33.01	4.4	40.80	13.06	4.4	53.55	40.09	4.5	41.74	10.49
5.2	49.25	32.32	5.3	68.84	33.11	5.4	40.65	13.35	5.4	53.49	40.44	5.5	41.83	10.85
6.2	48.94	32.34	6.3	67.70	33.18	6.4	40.48	13.61	6.4	53.43	40.76	6.5	41.88	11.19
7.2	48.65	32.35	7.3	66.62	33.23	7.4	40.32	13.85	7.4	53.35	41.06	7.5	41.92	11.51
8.2	48.39	32.34	8.3	65.63	33.28	8.4	40.16	14.07	8.4	53.29	41.32	8.5	41.94	11.80
9.2	48.15	32.34	9.3	64.71	33.33	9.4	40.03	14.28	9.4	53.24	41.57	9.5	41.98	12.07
10.2	47.91	32.36	10.3	63.84	33.39	10.4	39.92	14.49	10.4	53.19	41.83	10.5	42.04	12.33
11.2	47.67	32.39	11.3	62.98	33.47	11.4	39.81	14.71	11.4	53.16	42.08	11.5	42.13	12.60
12.2	47.42	32.44	12.3	62.08	33.57	12.4	39.70	14.95	12.4	53.14	42.36	12.5	42.23	12.88
13.2	47.16	32.50	13.3	61.11	33.68	13.4	39.58	15.21	13.4	53.11	42.66	13.5	42.34	13.18
14.2	46.87	32.56	14.2	60.06	33.78	14.4	39.44	15.49	14.4	53.07	42.98	14.5	42.44	13.50
15.2	46.56	32.60	15.2	58.93	33.88	15.4	39.28	15.77	15.4	53.02	43.32	15.5	42.52	13.85
16.2	46.23	32.61	16.2	57.73	33.95	16.4	39.11	16.04	16.4	52.94	43.66	16.5	42.56	14.22
17.2	45.90	32.60	17.2	56.51	33.99	17.4	38.92	16.30	17.4	52.84	43.99	17.5	42.57	14.59
18.2	45.58	32.55	18.2	55.30	34.00	18.3	38.71	16.54	18.4	52.72	44.31	18.5	42.54	14.94
19.2	45.28	32.48	19.2	54.12	33.99	19.3	38.49	16.75	19.4	52.60	44.60	19.5	42.48	15.27
20.2	44.99	32.40	20.2	53.01	33.96	20.3	38.28	16.93	20.4	52.46	44.87	20.5	42.40	15.59
21.2	44.72	32.32	21.2	51.97	33.92	21.3	38.07	17.10	21.4	52.34	45.12	21.5	42.31	15.88
22.2	44.46	32.22	22.2	50.98	33.88	22.3	37.88	17.25	22.4	52.20	45.35	22.5	42.22	16.17
23.2	44.21	32.14	23.2	50.02	33.84	23.3	37.69	17.40	23.4	52.08	45.58	23.5	42.14	16.44
24.2	43.97	32.06	24.2	49.08	33.81	24.3	37.51	17.55	24.4	51.96	45.80	24.5	42.07	16.71
25.2	43.74	32.00	25.2	48.15	33.79	25.3	37.33	17.71	25.4	51.86	46.03	25.4	42.01	16.98
26.2	43.49	31.94	26.2	47.21	33.78	26.3	37.16	17.88	26.4	51.76	46.27	26.4	41.97	17.27
27.2	43.24	31.89	27.2	46.22	33.78	27.3	36.98	18.05	27.4	51.65	46.52	27.4	41.92	17.57
28.2	42.96	31.83	28.2	45.18	33.77	28.3	36.79	18.25	28.4	51.54	46.79	28.4	41.87	17.87
29.2	42.68	31.77	29.2	44.09	33.76	29.3	36.59	18.45	29.4	51.42	47.06	29.4	41.82	18.20
30.2	42.37	31.70	30.2	42.94	33.74	30.3	36.38	18.65	30.4	51.28	47.34	30.4	41.74	18.53
31.2	42.07	31.60	31.2	41.75	33.70	31.3	36.14	18.84	31.4	51.13	47.63	31.4	41.64	18.88
13.68 +13.65			50.24 +50.23			12.30 +12.26			11.86 +11.81			20.38 +20.35		
0 ^h 56 ^m			1 ^h 29 ^m			4 ^h 9 ^m			5 ^h 34 ^m			7 ^h 1 ^m		
+85° 48'			+88° 51'			+85° 19'			+85° 9'			+87° 11'		

APPARENT PLACES OF CIRCUMPOLAR STARS

FOR THE UPPER TRANSIT AT WASHINGTON.

43 H. Cephei. Mag. 4.5			α Ursæ Minoris. (Polaris.) Mag. 2.1			Groombridge 750. Mag. 6.7			Groombridge 944. Mag. 6.4			51 H. Cephei. Mag. 5.3		
Mean Solar Date.	Right Ascension.	Declination North.	Mean Solar Date.	Right Ascension.	Declination North.	Mean Solar Date.	Right Ascension.	Declination North.	Mean Solar Date.	Right Ascension.	Declination North.	Mean Solar Date.	Right Ascension.	Declination North.
Feb.	h m 0 56	° ' " +85 48	Feb.	h m 1 28	° ' " +88 51	Feb.	h m 4 9	° ' " +85 20	Feb.	h m 5 34	° ' " +85 9	Feb.	h m 7 1	° ' " +85 1
0.2	42.07	31.60	0.2	41.75	33.70	0.3	36.14	18.84	0.4	51.13	47.63	0.4	41.64	18.84
1.2	41.76	31.48	1.2	40.56	33.64	1.3	35.88	19.01	1.4	50.96	47.90	1.4	41.49	19.01
2.2	41.47	31.34	2.2	39.40	33.54	2.3	35.63	19.14	2.4	50.77	48.15	2.4	41.31	19.14
3.2	41.20	31.17	3.2	38.31	33.42	3.3	35.38	19.26	3.4	50.57	48.37	3.4	41.11	19.26
4.2	40.95	30.99	4.2	37.30	33.30	4.3	35.13	19.35	4.4	50.38	48.56	4.4	40.90	20.00
5.2	40.72	30.82	5.2	36.38	33.17	5.3	34.89	19.42	5.4	50.20	48.73	5.4	40.69	20.00
6.2	40.51	30.65	6.2	35.54	33.04	6.3	34.68	19.49	6.4	50.03	48.88	6.4	40.50	20.00
7.2	40.32	30.51	7.2	34.73	32.93	7.3	34.48	19.56	7.4	49.87	49.04	7.4	40.33	20.00
8.2	40.12	30.38	8.2	33.91	32.84	8.3	34.29	19.64	8.3	49.72	49.21	8.4	40.18	20.13
9.2	39.90	30.27	9.2	33.06	32.76	9.3	34.10	19.75	9.3	49.59	49.40	9.4	40.05	20.13
10.2	39.67	30.15	10.2	32.13	32.69	10.3	33.89	19.87	10.3	49.44	49.60	10.4	39.92	20.13
11.1	39.41	30.03	11.2	31.11	32.61	11.3	33.66	20.00	11.3	49.27	49.83	11.4	39.77	20.13
12.1	39.14	29.89	12.2	30.04	32.51	12.3	33.42	20.13	12.3	49.09	50.06	12.4	39.59	20.13
13.1	38.87	29.72	13.2	28.96	32.39	13.3	33.16	20.25	13.3	48.89	50.28	13.4	39.37	20.13
14.1	38.60	29.52	14.2	27.87	32.25	14.3	32.88	20.34	14.3	48.67	50.49	14.4	39.12	20.13
15.1	38.35	29.31	15.2	26.82	32.08	15.3	32.60	20.40	15.3	48.44	50.68	15.4	38.84	20.13
16.1	38.12	29.07	16.2	25.84	31.88	16.3	32.33	20.43	16.3	48.21	50.84	16.4	38.55	20.13
17.1	37.90	28.82	17.2	24.93	31.67	17.3	32.05	20.45	17.3	47.97	50.97	17.4	38.24	20.13
18.1	37.71	28.58	18.2	24.10	31.46	18.3	31.79	20.44	18.3	47.73	51.08	18.4	37.93	20.13
19.1	37.53	28.34	19.1	23.33	31.26	19.3	31.55	20.43	19.3	47.51	51.18	19.4	37.62	20.13
20.1	37.36	28.12	20.1	22.59	31.06	20.3	31.32	20.42	20.3	47.30	51.28	20.4	37.33	20.13
21.1	37.20	27.89	21.1	21.88	30.87	21.3	31.09	20.41	21.3	47.09	51.37	21.4	37.05	20.13
22.1	37.03	27.68	22.1	21.15	30.69	22.3	30.86	20.41	22.3	46.89	51.47	22.4	36.78	20.13
23.1	36.86	27.47	23.1	20.41	30.52	23.2	30.64	20.42	23.3	46.70	51.58	23.4	36.53	20.13
24.1	36.67	27.28	24.1	19.64	30.36	24.2	30.41	20.45	24.3	46.51	51.70	24.4	36.28	20.13
25.1	36.48	27.08	25.1	18.82	30.19	25.2	30.18	20.48	25.3	46.31	51.84	25.4	36.02	20.13
26.1	36.27	26.87	26.1	17.96	30.01	26.2	29.93	20.51	26.3	46.10	51.98	26.4	35.75	20.13
27.1	36.05	26.64	27.1	17.06	29.82	27.2	29.67	20.53	27.3	45.87	52.13	27.4	35.45	20.13
28.1	35.84	26.39	28.1	16.15	29.61	28.2	29.39	20.55	28.3	45.63	52.26	28.4	35.13	20.13
29.1	35.64	26.12	29.1	15.28	29.38	29.2	29.11	20.53	29.3	45.37	52.37	29.4	34.77	20.13
30.1	35.46	25.83	30.1	14.46	29.12	30.2	28.82	20.49	30.3	45.11	52.46	30.3	34.39	20.13
31.1	35.31	25.52	31.1	13.73	28.85	31.2	28.55	20.42	31.3	44.85	52.51	31.3	33.99	20.13
13.68	+13.64	50.21	+50.20	12.31	+12.27	11.86	+11.82	20.40	+20.40					
0 ^h 56 ^m	54 ^s .030	1 ^h 29 ^m	15 ^s .60	4 ^h 9 ^m	27 ^s .362	5 ^h 34 ^m	35 ^s .250	7 ^h 1 ^m	5 ^s					
+85° 48'	6'' .45	+88° 51'	6'' .49	+85° 19'	51'' .71	+85° 9'	25'' .87	+87° 11'	5''					

[Eph 13]

APPARENT PLACES OF CIRCUMPOLAR STARS
FOR THE UPPER TRANSIT AT WASHINGTON.

48 H. Cephei. Mag. 4.5			α Ursae Minoris. (Polaris.) Mag. 2.1			Groombridge 750. Mag. 6.7			Groombridge 944. Mag. 6.4			51 H. Cephei. Mag. 5.3		
Mean Solar Date.	Right Ascension.	Declination North.	Mean Solar Date.	Right Ascension.	Declination North.	Mean Solar Date.	Right Ascension.	Declination North.	Mean Solar Date.	Right Ascension.	Declination North.	Mean Solar Date.	Right Ascension.	Declination North.
Mar. o 56	h m 35.84	° ' 26.39	Mar. 1 28	h m 16.15	° ' 29.61	Mar. 4 9	h m 29.39	° ' 20.55	Mar. 5 34	h m 45.63	° ' 52.26	Mar. 7 1	h m 35.13	° ' 25.92
	s 35.84	" 26.39		s 16.15	" 29.61		s 29.39	" 20.55		s 45.63	" 52.26		s 35.13	" 25.92
0.1	35.84	26.39	0.1	16.15	29.61	0.2	29.39	20.55	0.3	45.63	52.26	0.4	35.13	25.92
1.1	35.64	26.12	1.1	15.28	29.38	1.2	29.11	20.53	1.3	45.37	52.37	1.4	34.77	26.15
2.1	35.46	25.83	2.1	14.46	29.12	2.2	28.82	20.49	2.3	45.11	52.46	2.3	34.39	26.36
3.1	35.31	25.52	3.1	13.73	28.85	3.2	28.55	20.42	3.3	44.85	52.51	3.3	33.99	26.54
4.1	35.18	25.22	4.1	13.10	28.57	4.2	28.29	20.32	4.3	44.60	52.54	4.3	33.59	26.68
5.1	35.07	24.93	5.1	12.57	28.30	5.2	28.06	20.21	5.3	44.35	52.55	5.3	33.21	26.81
6.1	34.98	24.66	6.1	12.09	28.04	6.2	27.85	20.11	6.3	44.13	52.55	6.3	32.86	26.92
7.1	34.88	24.41	7.1	11.63	27.80	7.2	27.64	20.01	7.3	43.93	52.56	7.3	32.53	27.03
8.1	34.79	24.17	8.1	11.15	27.58	8.2	27.44	19.94	8.3	43.73	52.58	8.3	32.23	27.15
9.1	34.68	23.94	9.1	10.62	27.38	9.2	27.24	19.89	9.3	43.53	52.63	9.3	31.92	27.29
10.1	34.55	23.71	10.1	10.02	27.17	10.2	27.02	19.85	10.3	43.32	52.70	10.3	31.62	27.45
11.1	34.40	23.47	11.1	9.35	26.95	11.2	26.78	19.81	11.3	43.09	52.76	11.3	31.30	27.62
12.1	34.24	23.20	12.1	8.65	26.71	12.2	26.52	19.76	12.3	42.85	52.83	12.3	30.94	27.80
13.1	34.09	22.91	13.1	7.96	26.45	13.2	26.25	19.70	13.3	42.59	52.89	13.3	30.55	27.98
14.1	33.95	22.60	14.1	7.31	26.16	14.2	25.99	19.60	14.3	42.32	52.92	14.3	30.13	28.14
15.1	33.84	22.27	15.1	6.72	25.85	15.2	25.72	19.48	15.3	42.05	52.93	15.3	29.69	28.27
16.1	33.75	21.93	16.1	6.21	25.53	16.2	25.46	19.33	16.3	41.78	52.91	16.3	29.24	28.38
17.1	33.68	21.59	17.1	5.78	25.21	17.2	25.22	19.17	17.2	41.51	52.87	17.3	28.79	28.46
18.1	33.63	21.26	18.1	5.43	24.89	18.2	24.99	19.00	18.2	41.26	52.81	18.3	28.35	28.53
19.0	33.59	20.94	19.1	5.13	24.58	19.2	24.77	18.82	19.2	41.02	52.73	19.3	27.92	28.58
20.0	33.56	20.63	20.1	4.86	24.28	20.2	24.57	18.65	20.2	40.78	52.67	20.3	27.52	28.63
21.0	33.53	20.34	21.1	4.60	24.00	21.2	24.38	18.49	21.2	40.56	52.60	21.3	27.13	28.67
22.0	33.49	20.06	22.1	4.33	23.73	22.2	24.19	18.33	22.2	40.34	52.55	22.3	26.76	28.72
23.0	33.45	19.79	23.1	4.05	23.46	23.2	24.00	18.19	23.2	40.13	52.49	23.3	26.40	28.78
24.0	33.40	19.52	24.1	3.73	23.20	24.2	23.80	18.06	24.2	39.92	52.46	24.3	26.03	28.86
25.0	33.34	19.25	25.1	3.37	22.94	25.2	23.60	17.93	25.2	39.71	52.44	25.3	25.67	28.94
26.0	33.28	18.97	26.1	2.97	22.67	26.2	23.39	17.80	26.2	39.48	52.41	26.3	25.29	29.03
27.0	33.20	18.67	27.0	2.56	22.38	27.2	23.17	17.66	27.2	39.24	52.39	27.3	24.89	29.12
28.0	33.14	18.35	28.0	2.18	22.08	28.2	22.94	17.51	28.2	38.99	52.34	28.3	24.45	29.20
29.0	33.09	18.01	29.0	1.84	21.75	29.2	22.71	17.32	29.2	38.73	52.27	29.3	23.99	29.26
30.0	33.07	17.66	30.0	1.59	21.41	30.2	22.49	17.11	30.2	38.47	52.17	30.3	23.52	29.28
31.0	33.09	17.31	31.0	1.44	21.07	31.2	22.28	16.87	31.2	38.22	52.05	31.3	23.06	29.29
13.67	+13.64	50.14	+50.13	12.31	+12.27	11.86	+11.82	20.41	+20.38					
0 ^h 56 ^m	54°.030	1 ^h 29 ^m	15°.60	4 ^h 9 ^m	27°.362	5 ^h 34 ^m	35°.250	7 ^h 1 ^m	5°.64					
48'	6''.45	+88° 51'	6''.49	+85° 19'	51''.71	+85° 9'	25''.87	+87° 11'	5''.45					

[Eph 13]

APPARENT PLACES OF CIRCUMPOLAR STARS

FOR THE UPPER TRANSIT AT WASHINGTON.

43 H. Cephei. Mag. 4.5			α Ursæ Minoris. (Polaris.) Mag. 2.1			Groombridge 750. Mag. 6.7			Groombridge 944. Mag. 6.4			51 H. Cephei. Mag. 5.3		
Mean Solar Date.	Right Ascension.	Declination North.	Mean Solar Date.	Right Ascension.	Declination North.	Mean Solar Date.	Right Ascension.	Declination North.	Mean Solar Date.	Right Ascension.	Declination North.	Mean Solar Date.	Right Ascension.	Declination North.
Apr.	h m o 56	° ' " +85 48	Apr.	h m 1 28	° ' " +88 51	Apr.	h m 4 9	° ' " +85 20	Apr.	h m 5 34	° ' " +85 9	Apr.	h m 7 1	° ' " +87 11
0.0	33.09	17.31	0.0	1.44	21.07	0.2	22.28	16.87	0.2	38.22	52.05	0.3	23.06	29.29
1.0	33.12	16.97	1.0	1.38	20.73	1.1	22.09	16.62	1.2	37.98	51.91	1.3	22.61	29.26
2.0	33.17	16.65	2.0	1.42	20.41	2.1	21.93	16.38	2.2	37.76	51.74	2.3	22.18	29.21
3.0	33.24	16.35	3.0	1.50	20.10	3.1	21.79	16.14	3.2	37.57	51.59	3.3	21.79	29.16
4.0	33.30	16.08	4.0	1.56	19.82	4.1	21.66	15.92	4.2	37.39	51.44	4.3	21.42	29.11
5.0	33.35	15.83	5.0	1.59	19.55	5.1	21.53	15.72	5.2	37.21	51.32	5.3	21.07	29.08
6.0	33.38	15.57	6.0	1.56	19.29	6.1	21.39	15.53	6.2	37.02	51.22	6.3	20.72	29.07
6.9	33.38	15.31	7.0	1.46	19.03	7.1	21.23	15.36	7.2	36.83	51.12	7.3	20.36	29.07
7.9	33.38	15.04	8.0	1.31	18.75	8.1	21.07	15.18	8.2	36.63	51.03	8.2	19.99	29.09
8.9	33.38	14.75	9.0	1.16	18.46	9.1	20.88	14.99	9.2	36.41	50.94	9.2	19.58	29.09
9.9	33.40	14.43	10.0	1.03	18.15	10.1	20.70	14.77	10.2	36.18	50.82	10.2	19.14	29.10
10.9	33.42	14.10	11.0	0.96	17.81	11.1	20.51	14.53	11.2	35.95	50.68	11.2	18.68	29.08
11.9	33.47	13.76	12.0	0.98	17.46	12.1	20.34	14.27	12.2	35.71	50.51	12.2	18.22	29.03
12.9	33.55	13.41	13.0	1.08	17.11	13.1	20.17	13.98	13.2	35.48	50.32	13.2	17.76	28.96
13.9	33.64	13.08	14.0	1.26	16.76	14.1	20.03	13.69	14.2	35.28	50.12	14.2	17.31	28.87
14.9	33.75	12.76	14.9	1.49	16.43	15.1	19.90	13.40	15.2	35.08	49.91	15.2	16.88	28.76
15.9	33.88	12.46	15.9	1.77	16.10	16.1	19.79	13.10	16.2	34.89	49.68	16.2	16.47	28.64
16.9	34.00	12.17	16.9	2.07	15.79	17.1	19.69	12.82	17.2	34.72	49.47	17.2	16.07	28.53
17.9	34.12	11.90	17.9	2.36	15.51	18.1	19.59	12.55	18.2	34.56	49.26	18.2	15.71	28.41
18.9	34.23	11.64	18.9	2.64	15.23	19.1	19.51	12.30	19.2	34.41	49.07	19.2	15.36	28.31
19.9	34.34	11.39	19.9	2.89	14.96	20.1	19.42	12.05	20.2	34.25	48.89	20.2	15.02	28.21
20.9	34.44	11.14	20.9	3.10	14.70	21.1	19.33	11.82	21.2	34.10	48.72	21.2	14.68	28.12
21.9	34.53	10.89	21.9	3.27	14.44	22.1	19.23	11.59	22.1	33.94	48.55	22.2	14.32	28.05
22.9	34.61	10.62	22.9	3.43	14.16	23.1	19.12	11.35	23.1	33.77	48.39	23.2	13.95	27.97
23.9	34.69	10.34	23.9	3.59	13.87	24.1	18.99	11.11	24.1	33.59	48.22	24.2	13.57	27.90
24.9	34.79	10.05	24.9	3.77	13.56	25.1	18.87	10.85	25.1	33.40	48.02	25.2	13.17	27.81
25.9	34.91	9.75	25.9	4.03	13.24	26.1	18.76	10.55	26.1	33.21	47.80	26.2	12.75	27.69
26.9	35.05	9.44	26.9	4.40	12.91	27.1	18.66	10.24	27.1	33.03	47.55	27.2	12.33	27.54
27.9	35.22	9.15	27.9	4.87	12.59	28.1	18.58	9.92	28.1	32.87	47.28	28.2	11.93	27.36
28.9	35.42	8.87	28.9	5.42	12.28	29.1	18.53	9.58	29.1	32.73	47.00	29.2	11.55	27.16
29.9	35.63	8.62	29.9	6.03	12.00	30.1	18.50	9.25	30.1	32.60	46.71	30.2	11.20	26.96
30.9	35.83	8.39	30.9	6.64	11.74	31.1	18.48	8.94	31.1	32.50	46.44	31.2	10.89	26.75
13.66	+13.63	50.02	+50.01	12.30	+12.26	11.86	+11.82	20.41	+20.38					
0 ^h 56 ^m	54 ^s .030	1 ^h 29 ^m	15 ^s .60	4 ^h 9 ^m	27 ^s .362	5 ^h 34 ^m	35 ^s .250	7 ^h 1 ^m	5 ^s .64					
+85° 48'	6'' .45	+88° 51'	6'' .49	+85° 19'	51'' .71	+85° 9'	25'' .87	+87° 11'	5'' .45					

[Eph 15]

**APPARENT PLACES OF CIRCUMPOLAR STARS
FOR THE UPPER TRANSIT AT WASHINGTON.**

43 H. Cephei. Mag. 4.5			α Ursæ Minoris. (Polaris.) Mag. 2.1			Groombridge 750. Mag. 6.7			Groombridge 944. Mag. 6.4			51 H. Cephei. Mag. 5.3		
Mean Solar Date.	Right Ascension.	Declination North.	Mean Solar Date.	Right Ascension.	Declination North.	Mean Solar Date.	Right Ascension.	Declination North.	Mean Solar Date.	Right Ascension.	Declination North.	Mean Solar Date.	Right Ascension.	Declination North.
May	h m	° ' "	May	h m	° ' "	May	h m	° ' "	May	h m	° ' "	May	h m	° ' "
0 56	+85 48		1 28	+88 51		4 9	+85 19		5 34	+85 9		7 1	+87 11	
	s			s			s			s			s	
0.9	35.83	8.39	0.9	6.64	11.74	1.1	18.48	68.94	1.1	32.50	46.44	1.2	10.89	26.75
1.9	36.03	8.19	1.9	7.24	11.51	2.1	18.48	68.66	2.1	32.41	46.19	2.2	10.61	26.55
2.9	36.21	8.00	2.9	7.79	11.29	3.1	18.47	68.39	3.1	32.32	45.95	3.2	10.34	26.38
3.9	36.37	7.81	3.9	8.25	11.07	4.1	18.44	68.15	4.1	32.23	45.73	4.2	10.08	26.23
4.9	36.51	7.61	4.9	8.65	10.84	5.1	18.40	67.91	5.1	32.12	45.53	5.2	9.80	26.09
5.9	36.65	7.40	5.9	9.03	10.60	6.1	18.36	67.67	6.1	32.01	45.33	6.2	9.50	25.96
6.9	36.79	7.16	6.9	9.41	10.33	7.0	18.30	67.40	7.1	31.88	45.11	7.2	9.16	25.82
7.9	36.95	6.90	7.9	9.84	10.05	8.0	18.23	67.10	8.1	31.74	44.87	8.2	8.80	25.66
8.9	37.13	6.64	8.9	10.34	9.76	9.0	18.18	66.79	9.1	31.60	44.61	9.2	8.43	25.48
9.9	37.33	6.37	9.9	10.92	9.47	10.0	18.14	66.46	10.1	31.47	44.32	10.2	8.07	25.27
10.9	37.56	6.11	10.9	11.58	9.17	11.0	18.12	66.12	11.1	31.34	44.02	11.2	7.72	25.04
11.9	37.80	5.87	11.9	12.30	8.89	12.0	18.12	65.77	12.1	31.24	43.71	12.2	7.40	24.80
12.9	38.04	5.65	12.9	13.08	8.63	13.0	18.13	65.43	13.1	31.16	43.39	13.2	7.09	24.54
13.9	38.30	5.45	13.9	13.87	8.39	14.0	18.16	65.10	14.1	31.09	43.08	14.1	6.81	24.28
14.9	38.55	5.27	14.9	14.66	8.16	15.0	18.20	64.80	15.1	31.03	42.78	15.1	6.56	24.03
15.9	38.80	5.10	15.9	15.44	7.95	16.0	18.24	64.50	16.1	30.98	42.49	16.1	6.33	23.79
16.9	39.03	4.94	16.9	16.18	7.76	17.0	18.28	64.22	17.1	30.94	42.22	17.1	6.11	23.56
17.9	39.25	4.79	17.9	16.89	7.58	18.0	18.31	63.95	18.1	30.89	41.95	18.1	5.89	23.34
18.9	39.45	4.63	18.9	17.55	7.39	19.0	18.34	63.69	19.1	30.84	41.70	19.1	5.68	23.13
19.9	39.65	4.48	19.9	18.17	7.20	20.0	18.37	63.44	20.1	30.79	41.45	20.1	5.46	22.93
20.9	39.85	4.32	20.9	18.78	7.00	21.0	18.38	63.18	21.1	30.72	41.21	21.1	5.22	22.74
21.9	40.06	4.14	21.9	19.41	6.79	22.0	18.39	62.90	22.1	30.66	40.95	22.1	4.96	22.53
22.9	40.28	3.94	22.9	20.11	6.56	23.0	18.40	62.59	23.1	30.58	40.67	23.1	4.69	22.30
23.9	40.53	3.75	23.9	20.87	6.32	24.0	18.43	62.27	24.1	30.51	40.36	24.1	4.41	22.05
24.9	40.80	3.56	24.9	21.73	6.09	24.9	18.48	61.94	25.1	30.46	40.02	25.1	4.15	21.77
25.9	41.09	3.39	25.9	22.69	5.87	25.9	18.56	61.60	26.1	30.43	39.68	26.1	3.92	21.46
26.9	41.40	3.24	26.9	23.70	5.67	26.9	18.66	61.26	27.1	30.42	39.33	27.1	3.71	21.14
27.9	41.71	3.12	27.9	24.75	5.49	27.9	18.77	60.95	28.1	30.43	38.99	28.1	3.55	20.82
28.9	42.02	3.03	28.9	25.78	5.35	28.9	18.89	60.65	29.0	30.46	38.67	29.1	3.42	20.51
29.9	42.31	2.96	29.9	26.75	5.23	29.9	19.02	60.38	30.0	30.50	38.37	30.1	3.31	20.21
30.9	42.57	2.90	30.9	27.66	5.13	30.9	19.14	60.14	31.0	30.54	38.10	31.1	3.22	19.94
31.9	42.82	2.83	31.9	28.49	5.02	31.9	19.25	59.90	32.0	30.56	37.85	32.1	3.12	19.70
13.66	+13.62		49.92	+49.91		12.29	+12.25		11.86	+11.81		20.40	+20.37	
0 ^h 56 ^m	54°.030		1 ^h 29 ^m	15°.60		4 ^h 9 ^m	27°.362		5 ^h 34 ^m	35°.250		7 ^h 1 ^m	5°.64	
+85° 48'	6'' 45		+88° 51'	6'' 49		+85° 19'	51'' 71		+85° 9'	25'' 87		+87° 11'	5'' 45	

[Eph 15]

APPARENT PLACES OF CIRCUMPOLAR STARS

FOR THE UPPER TRANSIT AT WASHINGTON.

43 H. Cephei. Mag. 4.5			α Ursæ Minoris. (Polaris.) Mag. 2.1			Groombridge 750. Mag. 6.7			Groombridge 944. Mag. 6.4			51 H. Cephei. Mag. 5.3		
Mean Solar Date.	Right Ascension.	Declination North.	Mean Solar Date.	Right Ascension.	Declination North.	Mean Solar Date.	Right Ascension.	Declination North.	Mean Solar Date.	Right Ascension.	Declination North.	Mean Solar Date.	Right Ascension.	Declination North.
June	h m 0 56	° ' " +85 48	June	h m 1 28	° ' " +88 51	June	h m 4 9	° ' " +85 19	June	h m 5 34	° ' " +85 9	June	h m 7 1	° ' " +85 11
0.9	42.82	2.83	0.9	28.49	5.02	0.9	19.25	59.90	1.0	30.56	37.85	1.1	3.12	
1.8	43.05	2.75	1.9	29.26	4.89	1.9	19.34	59.67	2.0	30.57	37.60	2.1	3.00	
2.8	43.29	2.65	2.9	30.03	4.75	2.9	19.41	59.43	3.0	30.56	37.34	3.1	2.84	
3.8	43.53	2.53	3.9	30.82	4.60	3.9	19.49	59.16	4.0	30.55	37.06	4.1	2.67	
4.8	43.79	2.40	4.9	31.66	4.43	4.9	19.56	58.88	5.0	30.53	36.77	5.1	2.49	
5.8	44.07	2.27	5.9	32.58	4.25	5.9	19.65	58.57	6.0	30.52	36.45	6.1	2.30	
6.8	44.37	2.15	6.9	33.57	4.08	6.9	19.75	58.26	7.0	30.52	36.12	7.1	2.12	
7.8	44.68	2.04	7.9	34.62	3.92	7.9	19.88	57.95	8.0	30.54	35.77	8.1	1.96	
8.8	45.01	1.95	8.9	35.72	3.77	8.9	20.02	57.64	9.0	30.57	35.43	9.1	1.84	
9.8	45.33	1.88	9.8	36.85	3.65	9.9	20.17	57.33	10.0	30.61	35.08	10.1	1.74	
10.8	45.66	1.82	10.8	37.97	3.55	10.9	20.33	57.04	11.0	30.67	34.75	11.1	1.66	
11.8	45.98	1.79	11.8	39.08	3.46	11.9	20.50	56.78	12.0	30.75	34.43	12.1	1.61	
12.8	46.29	1.77	12.8	40.15	3.38	12.9	20.67	56.53	13.0	30.84	34.13	13.1	1.58	
13.8	46.59	1.76	13.8	41.17	3.32	13.9	20.84	56.30	14.0	30.92	33.85	14.1	1.56	
14.8	46.87	1.76	14.8	42.15	3.27	14.9	21.01	56.07	15.0	30.99	33.58	15.1	1.54	
15.8	47.13	1.75	15.8	43.08	3.21	15.9	21.17	55.86	15.9	31.07	33.33	16.1	1.51	
16.8	47.39	1.74	16.8	43.99	3.15	16.9	21.31	55.65	16.9	31.14	33.07	17.1	1.47	
17.8	47.66	1.71	17.8	44.89	3.07	17.9	21.44	55.43	17.9	31.20	32.81	18.1	1.42	
18.8	47.94	1.66	18.8	45.82	2.98	18.9	21.58	55.19	18.9	31.25	32.53	19.1	1.35	
19.8	48.23	1.61	19.8	46.82	2.88	19.9	21.72	54.94	19.9	31.30	32.22	20.0	1.27	
20.8	48.54	1.56	20.8	47.90	2.78	20.9	21.88	54.66	20.9	31.36	31.90	21.0	1.20	
21.8	48.87	1.52	21.8	49.07	2.69	21.9	22.06	54.37	21.9	31.44	31.56	22.0	1.14	
22.8	49.23	1.51	22.8	50.30	2.62	22.9	22.27	54.09	22.9	31.55	31.22	23.0	1.12	
23.8	49.59	1.53	23.8	51.57	2.58	23.9	22.49	53.83	23.9	31.68	30.88	24.0	1.15	
24.8	49.94	1.58	24.8	52.84	2.57	24.9	22.73	53.59	24.9	31.83	30.56	25.0	1.21	
25.8	50.28	1.65	25.8	54.06	2.58	25.9	22.98	53.37	25.9	31.98	30.27	26.0	1.30	
26.8	50.60	1.73	26.8	55.21	2.61	26.9	23.22	53.19	26.9	32.14	29.99	27.0	1.40	
27.8	50.89	1.82	27.8	56.27	2.64	27.9	23.44	53.03	27.9	32.29	29.75	28.0	1.51	
28.8	51.16	1.90	28.8	57.25	2.67	28.9	23.65	52.88	28.9	32.43	29.53	29.0	1.60	
29.8	51.43	1.96	29.8	58.22	2.68	29.9	23.84	52.71	29.9	32.56	29.29	30.0	1.68	
30.8	51.69	2.01	30.8	59.18	2.68	30.9	24.03	52.54	30.9	32.68	29.04	31.0	1.72	
31.8	51.97	2.04	31.8	60.17	2.67	31.9	24.21	52.34	31.9	32.78	28.78	32.0	1.74	
13.66	+13.62		49.86	+49.86		12.29	+12.25		11.85	+11.81		20.38	+20.38	
0 ^h 56 ^m	54 ^s .030		1 ^h 29 ^m	15 ^s .60		4 ^h 9 ^m	27 ^s .362		5 ^h 34 ^m	35 ^s .250		7 ^h 1 ^m		
+85° 48'	6'' .45		+88° 51'	6'' .49		+85° 19'	51'' .71		+85° 9'	25'' .87		+87° 11'		5

(Rip 15)

APPARENT PLACES OF CIRCUMPOLAR STARS
FOR THE UPPER TRANSIT AT WASHINGTON.

48 H. Cephei. Mag. 4.5			α Ursæ Minoris. (Polaris.) Mag. 2.1			Groombridge 750. Mag. 6.7			Groombridge 944. Mag. 6.4			51 H. Cephei. Mag. 5.3		
Mean Solar Date.	Right Ascension.	Declination North.	Mean Solar Date.	Right Ascension.	Declination North.	Mean Solar Date.	Right Ascension.	Declination North.	Mean Solar Date.	Right Ascension.	Declination North.	Mean Solar Date.	Right Ascension.	Declination North.
July	h m ° '		July	h m ° '		July	h m ° '		July	h m ° '		July	h m ° '	
0 56	+85 48		1 28	+88 51		4 9	+85 19		5 34	+85 9		7 1	+87 11	
0.8	51.69	2.01	0.8	59.18	2.68	0.9	24.03	52.54	0.9	32.68	29.04	1.0	1.72	10.54
1.8	51.97	2.04	1.8	60.17	2.67	1.9	24.21	52.34	1.9	32.78	28.78	2.0	1.74	10.25
2.8	52.27	2.05	2.8	61.22	2.64	2.9	24.40	52.12	2.9	32.89	28.50	3.0	1.77	9.93
3.8	52.59	2.08	3.8	62.34	2.60	3.9	24.61	51.89	3.9	33.01	28.20	4.0	1.79	9.60
4.8	52.92	2.12	4.8	63.52	2.58	4.9	24.83	51.66	4.9	33.14	27.89	5.0	1.83	9.25
5.8	53.27	2.17	5.8	64.76	2.58	5.9	25.07	51.43	5.9	33.28	27.58	6.0	1.89	8.89
6.7	53.61	2.24	6.8	66.02	2.59	6.9	25.32	51.21	6.9	33.44	27.27	7.0	1.99	8.53
7.7	53.96	2.33	7.8	67.27	2.62	7.9	25.58	51.00	7.9	33.62	26.97	7.9	2.12	8.17
8.7	54.30	2.45	8.8	68.50	2.68	8.9	25.85	50.82	8.9	33.81	26.69	8.9	2.26	7.82
9.7	54.62	2.57	9.8	69.70	2.75	9.9	26.13	50.66	9.9	34.00	26.42	9.9	2.43	7.48
10.7	54.93	2.71	10.8	70.85	2.83	10.9	26.40	50.51	10.9	34.19	26.18	10.9	2.61	7.16
11.7	55.23	2.86	11.8	71.94	2.92	11.9	26.66	50.38	11.9	34.39	25.94	11.9	2.79	6.86
12.7	55.51	3.00	12.8	72.98	3.03	12.9	26.90	50.27	12.9	34.59	25.73	12.9	2.98	6.57
13.7	55.77	3.14	13.8	73.98	3.12	13.9	27.15	50.16	13.9	34.77	25.53	13.9	3.15	6.30
14.7	56.03	3.26	14.8	74.95	3.20	14.9	27.38	50.04	14.9	34.94	25.32	14.9	3.31	6.02
15.7	56.30	3.37	15.7	75.94	3.26	15.9	27.60	49.91	15.9	35.10	25.11	15.9	3.45	5.74
16.7	56.58	3.48	16.7	76.96	3.31	16.9	27.84	49.76	16.9	35.27	24.87	16.9	3.58	5.44
17.7	56.88	3.57	17.7	78.06	3.36	17.9	28.08	49.59	17.9	35.44	24.61	17.9	3.71	5.13
18.7	57.20	3.68	18.7	79.23	3.41	18.9	28.34	49.42	18.9	35.61	24.34	18.9	3.85	4.79
19.7	57.54	3.80	19.7	80.47	3.47	19.8	28.63	49.24	19.9	35.81	24.06	19.9	4.01	4.44
20.7	57.88	3.95	20.7	81.77	3.57	20.8	28.92	49.07	20.9	36.03	23.77	20.9	4.21	4.07
21.7	58.22	4.14	21.7	83.07	3.69	21.8	29.24	48.93	21.9	36.28	23.50	21.9	4.46	3.72
22.7	58.55	4.35	22.7	84.33	3.84	22.8	29.57	48.81	22.9	36.53	23.26	22.9	4.74	3.37
23.7	58.86	4.57	23.7	85.52	4.02	23.8	29.89	48.72	23.9	36.79	23.05	23.9	5.04	3.05
24.7	59.14	4.80	24.7	86.62	4.20	24.8	30.19	48.67	24.9	37.04	22.86	24.9	5.35	2.76
25.7	59.40	5.03	25.7	87.63	4.38	25.8	30.49	48.63	25.9	37.29	22.69	25.9	5.65	2.49
26.7	59.65	5.24	26.7	88.58	4.55	26.8	30.76	48.57	26.9	37.52	22.53	26.9	5.92	2.24
27.7	59.89	5.43	27.7	89.51	4.70	27.8	31.02	48.51	27.9	37.74	22.37	27.9	6.17	1.99
28.7	60.14	5.61	28.7	90.46	4.83	28.8	31.27	48.44	28.9	37.94	22.19	28.9	6.40	1.73
29.7	60.40	5.78	29.7	91.46	4.95	29.8	31.53	48.35	29.9	38.15	21.99	29.9	6.61	1.45
30.7	60.68	5.94	30.7	92.51	5.06	30.8	31.79	48.25	30.9	38.36	21.78	30.9	6.82	1.16
31.7	60.98	6.11	31.7	93.63	5.18	31.8	32.08	48.13	31.9	38.57	21.55	31.9	7.05	0.84
32.66	+13.62	49.86	+49.86	12.28	+12.24	11.84	+11.80	20.36	+20.34					
0° 56'	54°.030	1 ^h 29 ^m	15°.60	4 ^h 9 ^m	27°.362	5 ^h 34 ^m	35°.250	7 ^h 1 ^m	5°.64					
48° 48'	6°.45	+88° 51'	6°.49	+85° 19'	51°.71	+85° 9'	25°.87	+87° 11'	5°.45					

APPARENT PLACES OF CIRCUMPOLAR STARS
FOR THE UPPER TRANSIT AT WASHINGTON.

43 H. Cephei. Mag. 4.5			α Ursæ Minoris. (Polaris.) Mag. 2.1			Groombridge 760. Mag. 6.7			Groombridge 944. Mag. 6.4			51 H. Cephei. Mag. 5.3		
Mean Solar Date.	Right Ascension.	Declination North.	Mean Solar Date.	Right Ascension.	Declination North.	Mean Solar Date.	Right Ascension.	Declination North.	Mean Solar Date.	Right Ascension.	Declination North.	Mean Solar Date.	Right Ascension.	Declination North.
Aug.	h m	° '	Aug.	h m	° '	Aug.	h m	° '	Aug.	h m	° '	Aug.	h m	° '
	0 57	+85 48		1 29	+88 51		4 9	+85 19		5 34	+85 9		7 1	+85 1
	s	"		s	"		s	"		s	"		s	"
0.7	0.98	6.11	0.7	33.63	5.18	0.8	32.08	48.13	0.9	38.57	21.55	0.9	7.05	6
1.7	1.28	6.30	1.7	34.79	5.31	1.8	32.38	48.01	1.9	38.81	21.32	1.9	7.30	6
2.7	1.60	6.50	2.7	35.99	5.46	2.8	32.69	47.91	2.9	39.06	21.09	2.9	7.57	6
3.7	1.90	6.72	3.7	37.18	5.63	3.8	33.01	47.82	3.9	39.32	20.87	3.9	7.87	5
4.7	2.20	6.97	4.7	38.36	5.82	4.8	33.34	47.75	4.9	39.59	20.67	4.9	8.19	5
5.7	2.49	7.22	5.7	39.49	6.02	5.8	33.66	47.70	5.9	39.87	20.48	5.9	8.54	5
6.7	2.77	7.49	6.7	40.57	6.24	6.8	33.98	47.67	6.9	40.16	20.31	6.9	8.90	5
7.7	3.02	7.76	7.7	41.59	6.47	7.8	34.30	47.66	7.9	40.44	20.17	7.9	9.27	5
8.7	3.26	8.04	8.7	42.56	6.71	8.8	34.61	47.66	8.9	40.71	20.04	8.9	9.64	5
9.7	3.48	8.32	9.7	43.47	6.94	9.8	34.91	47.68	9.9	40.98	19.92	9.9	10.00	5
10.7	3.69	8.58	10.7	44.34	7.16	10.8	35.20	47.68	10.8	41.24	19.81	10.9	10.34	5
11.7	3.90	8.83	11.7	45.20	7.37	11.8	35.48	47.69	11.8	41.49	19.69	11.9	10.67	5
12.6	4.13	9.06	12.7	46.08	7.56	12.8	35.75	47.67	12.8	41.73	19.56	12.9	10.97	5
13.6	4.36	9.28	13.7	47.02	7.74	13.8	36.03	47.63	13.8	41.97	19.41	13.9	11.27	5
14.6	4.61	9.51	14.7	48.03	7.92	14.8	36.32	47.58	14.8	42.22	19.24	14.9	11.58	5
15.6	4.88	9.75	15.7	49.11	8.11	15.8	36.63	47.53	15.8	42.49	19.05	15.9	11.91	5
16.6	5.17	10.01	16.7	50.24	8.33	16.8	36.96	47.48	16.8	42.78	18.87	16.9	12.26	5
17.6	5.46	10.29	17.7	51.38	8.57	17.8	37.31	47.45	17.8	43.08	18.69	17.9	12.65	5
18.6	5.73	10.61	18.7	52.49	8.84	18.8	37.67	47.45	18.8	43.40	18.55	18.9	13.07	5
19.6	5.98	10.95	19.7	53.55	9.14	19.8	38.02	47.49	19.8	43.73	18.43	19.9	13.53	5
20.6	6.21	11.29	20.7	54.51	9.44	20.8	38.37	47.55	20.8	44.06	18.33	20.9	14.01	5
21.6	6.41	11.64	21.6	55.36	9.75	21.8	38.70	47.62	21.8	44.37	18.26	21.9	14.47	5
22.6	6.59	11.97	22.6	56.15	10.05	22.8	39.01	47.70	22.8	44.67	18.21	22.9	14.91	5
23.6	6.76	12.29	23.6	56.90	10.33	23.8	39.31	47.78	23.8	44.95	18.16	23.9	15.32	5
24.6	6.94	12.58	24.6	57.66	10.59	24.8	39.60	47.84	24.8	45.21	18.09	24.9	15.71	5
25.6	7.13	12.86	25.6	58.44	10.83	25.7	39.88	47.88	25.8	45.47	18.01	25.9	16.08	5
26.6	7.33	13.13	26.6	59.25	11.07	26.7	40.16	47.91	26.8	45.74	17.91	26.9	16.44	5
27.6	7.54	13.41	27.6	60.13	11.31	27.7	40.45	47.93	27.8	46.01	17.80	27.9	16.82	5
28.6	7.76	13.69	28.6	61.06	11.55	28.7	40.77	47.94	28.8	46.29	17.68	28.9	17.20	5
29.6	8.00	13.99	29.6	62.03	11.81	29.7	41.10	47.96	29.8	46.59	17.55	29.9	17.62	5
30.6	8.23	14.31	30.6	62.99	12.09	30.7	41.43	47.99	30.8	46.90	17.43	30.9	18.05	5
31.6	8.45	14.64	31.6	63.94	12.38	31.7	41.77	48.04	31.8	47.21	17.33	31.9	18.50	5
13.66	+13.63		49.92	+49.91		12.28	+12.24		11.84	+11.80		20.34	+20	
0 ^h 56 ^m	54°.030		1 ^h 29 ^m	15°.60		4 ^h 9 ^m	27°.362		5 ^h 34 ^m	35°.250		7 ^h 1 ^m	5'	
+85° 48'	6''.45		+88° 51'	6''.49		+85° 19'	51''.71		+85° 9'	25''.87		+87° 11'	5''	

[Eph 13]

APPARENT PLACES OF CIRCUMPOLAR STARS
FOR THE UPPER TRANSIT AT WASHINGTON.

48 H. Cephei. Mag. 4.5			α Ursæ Minoris. (Polaris.) Mag. 2.1			Groombridge 750. Mag. 6.7			Groombridge 944. Mag. 6.4			51 H. Cephei. Mag. 5.3		
Mean Solar Date.	Right Ascension.	Declination North.	Mean Solar Date.	Right Ascension.	Declination North.	Mean Solar Date.	Right Ascension.	Declination North.	Mean Solar Date.	Right Ascension.	Declination North.	Mean Solar Date.	Right Ascension.	Declination North.
h m s	° ' "		h m s	° ' "		h m s	° ' "		h m s	° ' "		h m s	° ' "	
Sept. 0 57	+85 48		Sept. 1 30	+88 51		Sept. 4 9	+85 19		Sept. 5 34	+85 9		Sept. 7 1	+87 10	
0.6	8.45	14.64	0.6	3.94	12.38	0.7	41.77	48.04	0.8	47.21	17.33	0.9	18.50	52.92
1.6	8.66	14.99	1.6	4.85	12.69	1.7	42.11	48.12	1.8	47.54	17.26	1.8	18.98	52.70
2.6	8.85	15.35	2.6	5.71	13.02	2.7	42.45	48.21	2.8	47.87	17.20	2.8	19.47	52.49
3.6	9.03	15.72	3.6	6.52	13.36	3.7	42.78	48.32	3.8	48.21	17.17	3.8	19.97	52.31
4.6	9.19	16.10	4.6	7.25	13.70	4.7	43.10	48.45	4.8	48.53	17.15	4.8	20.47	52.14
5.6	9.33	16.46	5.6	7.90	14.04	5.7	43.41	48.59	5.8	48.84	17.14	5.8	20.96	52.00
6.6	9.46	16.81	6.6	8.52	14.37	6.7	43.70	48.73	6.8	49.15	17.14	6.8	21.44	51.86
7.6	9.59	17.15	7.6	9.12	14.69	7.7	43.98	48.87	7.8	49.44	17.14	7.8	21.90	51.73
8.6	9.72	17.48	8.6	9.72	14.99	8.7	44.26	48.99	8.8	49.72	17.13	8.8	22.35	51.59
9.6	9.86	17.80	9.6	10.35	15.28	9.7	44.53	49.09	9.8	50.00	17.11	9.8	22.78	51.43
10.6	10.01	18.10	10.6	11.04	15.57	10.7	44.82	49.17	10.8	50.28	17.07	10.8	23.20	51.26
11.6	10.18	18.42	11.6	11.81	15.86	11.7	45.12	49.25	11.8	50.57	17.01	11.8	23.63	51.07
12.6	10.37	18.76	12.6	12.63	16.16	12.7	45.45	49.32	12.8	50.88	16.94	12.8	24.09	50.86
13.6	10.56	19.12	13.6	13.48	16.48	13.7	45.79	49.41	13.8	51.21	16.88	13.8	24.58	50.65
14.6	10.75	19.50	14.6	14.32	16.83	14.7	46.14	49.53	14.8	51.55	16.85	14.8	25.11	50.46
15.6	10.91	19.90	15.6	15.09	17.20	15.7	46.48	49.67	15.8	51.91	16.84	15.8	25.66	50.29
16.6	11.05	20.32	16.6	15.77	17.59	16.7	46.82	49.84	16.7	52.27	16.85	16.8	26.23	50.14
17.6	11.16	20.74	17.6	16.35	17.99	17.7	47.14	50.04	17.7	52.62	16.89	17.8	26.79	50.02
18.6	11.25	21.15	18.6	16.84	18.38	18.7	47.44	50.25	18.7	52.95	16.96	18.8	27.34	49.94
19.6	11.32	21.54	19.6	17.27	18.76	19.7	47.72	50.45	19.7	53.26	17.03	19.8	27.87	49.86
20.6	11.39	21.91	20.6	17.67	19.11	20.7	47.98	50.64	20.7	53.55	17.09	20.8	28.37	49.78
21.6	11.47	22.25	21.6	18.10	19.44	21.7	48.24	50.82	21.7	53.83	17.14	21.8	28.83	49.70
22.6	11.56	22.58	22.6	18.57	19.76	22.7	48.50	50.97	22.7	54.11	17.17	22.8	29.29	49.60
23.6	11.66	22.90	23.6	19.08	20.08	23.7	48.76	51.11	23.7	54.40	17.19	23.8	29.75	49.48
24.6	11.78	23.24	24.6	19.65	20.39	24.7	49.04	51.25	24.7	54.69	17.19	24.8	30.21	49.36
25.6	11.90	23.59	25.6	20.25	20.72	25.7	49.33	51.39	25.7	54.99	17.19	25.8	30.69	49.23
26.6	12.03	23.96	26.6	20.87	21.06	26.7	49.64	51.54	26.7	55.31	17.20	26.8	31.20	49.09
27.6	12.14	24.34	27.6	21.47	21.42	27.7	49.95	51.70	27.7	55.63	17.21	27.8	31.73	48.96
28.6	12.25	24.74	28.6	22.04	21.80	28.7	50.26	51.88	28.7	55.96	17.25	28.8	32.27	48.84
29.6	12.35	25.14	29.6	22.55	22.19	29.7	50.56	52.09	29.7	56.29	17.31	29.8	32.83	48.74
30.6	12.42	25.55	30.6	23.00	22.59	30.7	50.86	52.31	30.7	56.63	17.39	30.8	33.40	48.67
31.6	12.48	25.98	31.6	23.38	23.00	31.6	51.15	52.55	31.7	56.95	17.49	31.8	33.97	48.61
13.67	+13.63		50.03	+50.02		12.28	+12.24		11.84	+11.80		20.33	+20.31	
0 ^h 56 ^m	54 ^s .030		1 ^h 29 ^m	15 ^s .60		4 ^h 9 ^m	27 ^s .362		5 ^h 34 ^m	35 ^s .250		7 ^h 1 ^m	5 ^s .64	
48 ^s	6 ^s .45		+88° 51'	6 ^s .49		+85° 19'	51 ^s .71		+85° 9'	25 ^s .87		+87° 11'	5 ^s .45	

[Eph. 13]

**APPARENT PLACES OF CIRCUMPOLAR STARS
FOR THE UPPER TRANSIT AT WASHINGTON.**

43 H. Cephei. Mag. 4.5			α Ursæ Minoris. (Polaris.) Mag. 2.1			Groombridge 760. Mag. 6.7			Groombridge 944. Mag. 6.4			51 H. Cephei. Mag. 5.3		
Mean Solar Date.	Right Ascen- sion.	Declina- tion North.	Mean Solar Date.	Right Ascen- sion.	Declina- tion North.	Mean Solar Date.	Right Ascen- sion.	Declina- tion North.	Mean Solar Date.	Right Ascen- sion.	Declina- tion North.	Mean Solar Date.	Right Ascen- sion.	Declina- tion North.
Oct.	h m 0 57	° +85 48	Oct.	h m 1 30	° +88 51	Oct.	h m 4 9	° +85 19	Oct.	h m 5 34	° +85 9	Oct.	h m 7 1	° +87 20
	s "	"		s "	"		s "	"		s "	"		s "	"
0.5	12.42	25.55	0.5	23.00	22.59	0.7	50.86	52.31	0.7	56.63	17.39	0.8	33.40	48.67
1.5	12.48	25.98	1.5	23.38	23.00	1.6	51.15	52.55	1.7	56.95	17.49	1.8	33.97	48.61
2.5	12.51	26.38	2.5	23.69	23.40	2.6	51.43	52.80	2.7	57.27	17.61	2.8	34.54	48.57
3.5	12.53	26.78	3.5	23.95	23.79	3.6	51.69	53.05	3.7	57.57	17.73	3.8	35.08	48.56
4.5	12.54	27.17	4.5	24.17	24.17	4.6	51.93	53.30	4.7	57.87	17.85	4.8	35.61	48.54
5.5	12.56	27.55	5.5	24.38	24.54	5.6	52.17	53.55	5.7	58.16	17.97	5.8	36.12	48.52
6.5	12.58	27.90	6.5	24.60	24.90	6.6	52.41	53.77	6.7	58.43	18.08	6.8	36.60	48.49
7.5	12.61	28.25	7.5	24.87	25.24	7.6	52.64	53.97	7.7	58.71	18.17	7.7	37.07	48.45
8.5	12.67	28.60	8.5	25.21	25.57	8.6	52.89	54.16	8.7	58.99	18.25	8.7	37.55	48.38
9.5	12.73	28.95	9.5	25.61	25.92	9.6	53.15	54.36	9.7	59.28	18.31	9.7	38.05	48.31
10.5	12.81	29.32	10.5	26.04	26.28	10.6	53.43	54.55	10.7	59.59	18.37	10.7	38.57	48.23
11.5	12.88	29.71	11.5	26.47	26.66	11.6	53.72	54.76	11.7	59.92	18.45	11.7	39.13	48.15
12.5	12.94	30.13	12.5	26.86	27.07	12.6	54.02	55.00	12.7	60.26	18.55	12.7	39.71	48.09
13.5	12.96	30.57	13.5	27.17	27.50	13.6	54.30	55.27	13.7	60.60	18.68	13.7	40.31	48.07
14.5	12.97	31.01	14.5	27.38	27.94	14.6	54.58	55.56	14.7	60.92	18.83	14.7	40.92	48.07
15.5	12.95	31.44	15.5	27.49	28.37	15.6	54.83	55.87	15.7	61.24	19.00	15.7	41.51	48.09
16.5	12.90	31.84	16.5	27.51	28.79	16.6	55.06	56.18	16.7	61.53	19.20	16.7	42.08	48.14
17.5	12.85	32.22	17.5	27.49	29.19	17.6	55.27	56.48	17.7	61.80	19.39	17.7	42.61	48.19
18.5	12.80	32.58	18.5	27.47	29.57	18.6	55.46	56.77	18.7	62.06	19.57	18.7	43.10	48.24
19.5	12.77	32.93	19.5	27.47	29.92	19.6	55.66	57.04	19.7	62.31	19.73	19.7	43.58	48.28
20.5	12.74	33.27	20.5	27.54	30.26	20.6	55.86	57.28	20.7	62.57	19.88	20.7	44.05	48.31
21.5	12.73	33.60	21.5	27.65	30.59	21.6	56.06	57.52	21.7	62.82	20.01	21.7	44.53	48.31
22.5	12.73	33.94	22.5	27.81	30.94	22.6	56.28	57.75	22.6	63.08	20.13	22.7	45.01	48.31
23.5	12.74	34.30	23.5	27.98	31.30	23.6	56.51	57.99	23.6	63.36	20.25	23.7	45.51	48.30
24.4	12.73	34.66	24.5	28.15	31.67	24.6	56.74	58.24	24.6	63.66	20.38	24.7	46.04	48.29
25.4	12.73	35.05	25.5	28.29	32.07	25.6	56.98	58.51	25.6	63.94	20.53	25.7	46.58	48.30
26.4	12.71	35.46	26.5	28.37	32.47	26.6	57.21	58.80	26.6	64.24	20.70	26.7	47.14	48.33
27.4	12.66	35.86	27.5	28.39	32.87	27.6	57.43	59.10	27.6	64.53	20.90	27.7	47.70	48.38
28.4	12.61	36.26	28.5	28.34	33.29	28.6	57.65	59.43	28.6	64.82	21.11	28.7	48.25	48.45
29.4	12.53	36.64	29.5	28.22	33.70	29.6	57.85	59.77	29.6	65.09	21.34	29.7	48.80	48.54
30.4	12.43	37.03	30.5	28.03	34.10	30.6	58.03	60.11	30.6	65.35	21.58	30.7	49.34	48.65
31.4	12.32	37.40	31.5	27.80	34.48	31.6	58.20	60.44	31.6	65.60	21.82	31.7	49.86	48.76
13.68	+13.65	50.17	+50.16	12.29	+12.25	11.84	+11.80	20.33	+20.30					
0 ^h 56 ^m	54 ^h .030	1 ^h 20 ^m	15 ^h .60	4 ^h 9 ^m	27 ^h .362	5 ^h 34 ^m	35 ^h .250	7 ^h 1 ^m	5 ^h .64					
+85° 48'	6''-.45	+88° 51'	6''-.49	+85° 19'	51''-.71	+85° 9'	25''-.87	+87° 11'	5''-.45					

[Eph 15]

APPARENT PLACES OF CIRCUMPOLAR STARS
FOR THE UPPER TRANSIT AT WASHINGTON.

H. Cephei. Mag. 4.5			α Ursæ Minoris. (Polaris.) Mag. 2.1			Groombridge 760. Mag. 6.7			Groombridge 944. Mag. 6.4			51 H. Cephei. Mag. 5.3		
Right Ascension.	Declination North.	Mean Solar Date.	Right Ascension.	Declination North.	Mean Solar Date.	Right Ascension.	Declination North.	Mean Solar Date.	Right Ascension.	Declination North.	Mean Solar Date.	Right Ascension.	Declination North.	Mean Solar Date.
h m ° ' s			h m ° ' s			h m ° ' s			h m ° ' s			h m ° ' s		
0 57 +85 48	Nov.	1 30 +88 51	Nov.	4 9 +85 20	Nov.	5 35 +85 9	Nov.	7 1 +87 10						
12.32 37.40	0.5	27.80 34.48	0.6	58.20 0.44	0.6	5.60 21.82	0.7	49.86 48.76						
12.21 37.75	1.5	27.54 34.86	1.6	58.35 0.77	1.6	5.84 22.06	1.7	50.35 48.88						
12.10 38.08	2.4	27.30 35.21	2.6	58.49 1.08	2.6	6.06 22.28	2.7	50.82 48.99						
12.00 38.40	3.4	27.09 35.55	3.6	58.64 1.38	3.6	6.28 22.49	3.7	51.28 49.09						
11.92 38.72	4.4	26.93 35.88	4.6	58.79 1.65	4.6	6.50 22.69	4.7	51.72 49.17						
11.86 39.04	5.4	26.83 36.21	5.6	58.96 1.92	5.6	6.73 22.87	5.7	52.18 49.24						
11.80 39.37	6.4	26.78 36.55	6.5	59.14 2.19	6.6	6.97 23.04	6.7	52.66 49.29						
11.75 39.72	7.4	26.75 36.92	7.5	59.33 2.48	7.6	7.23 23.22	7.7	53.16 49.35						
11.69 40.10	8.4	26.69 37.31	8.5	59.53 2.78	8.6	7.50 23.42	8.7	53.70 49.42						
11.61 40.48	9.4	26.56 37.71	9.5	59.72 3.11	9.6	7.77 23.65	9.7	54.24 49.51						
11.51 40.88	10.4	26.35 38.13	10.5	59.91 3.47	10.6	8.05 23.91	10.7	54.80 49.63						
11.37 41.27	11.4	26.03 38.54	11.5	60.07 3.84	11.6	8.30 24.19	11.7	55.35 49.78						
11.21 41.65	12.4	25.61 38.94	12.5	60.21 4.22	12.6	8.54 24.49	12.7	55.88 49.95						
11.04 41.99	13.4	25.13 39.31	13.5	60.33 4.59	13.6	8.75 24.79	13.6	56.36 50.13						
10.86 42.31	14.4	24.62 39.65	14.5	60.42 4.94	14.6	8.94 25.08	14.6	56.80 50.32						
10.70 42.60	15.4	24.14 39.98	15.5	60.51 5.27	15.6	9.12 25.35	15.6	57.22 50.50						
10.54 42.87	16.4	23.70 40.29	16.5	60.60 5.58	16.6	9.29 25.60	16.6	57.62 50.66						
10.41 43.15	17.4	23.33 40.58	17.5	60.70 5.88	17.6	9.46 25.83	17.6	58.02 50.81						
10.29 43.42	18.4	22.99 40.88	18.5	60.81 6.16	18.6	9.64 26.05	18.6	58.42 50.94						
10.17 43.70	19.4	22.69 41.19	19.5	60.92 6.46	19.6	9.83 26.27	19.6	58.84 51.07						
10.06 44.00	20.4	22.38 41.51	20.5	61.04 6.76	20.6	10.03 26.50	20.6	59.27 51.19						
9.93 44.31	21.4	22.06 41.85	21.5	61.17 7.07	21.6	10.24 26.74	21.6	59.72 51.34						
9.80 44.63	22.4	21.69 42.20	22.5	61.28 7.39	22.6	10.45 27.00	22.6	60.18 51.49						
9.65 44.96	23.4	21.26 42.55	23.5	61.39 7.74	23.6	10.65 27.28	23.6	60.64 51.66						
9.48 45.27	24.4	20.76 42.90	24.5	61.50 8.10	24.6	10.85 27.58	24.6	61.11 51.86						
9.28 45.59	25.4	20.19 43.25	25.5	61.59 8.48	25.6	11.03 27.89	25.6	61.56 52.07						
9.07 45.90	26.4	19.56 43.60	26.5	61.66 8.85	26.6	11.21 28.21	26.6	62.00 52.31						
8.84 46.18	27.4	18.87 43.93	27.5	61.71 9.22	27.6	11.36 28.54	27.6	62.42 52.55						
8.62 46.46	28.4	18.15 44.24	28.5	61.74 9.59	28.5	11.50 28.87	28.6	62.81 52.79						
8.39 46.71	29.4	17.43 44.53	29.5	61.77 9.94	29.5	11.64 29.18	29.6	63.17 53.03						
8.17 46.93	30.4	16.73 44.80	30.5	61.80 10.27	30.5	11.76 29.48	30.6	63.51 53.27						
7.97 47.15	31.4	16.08 45.05	31.5	61.82 10.59	31.5	11.87 29.77	31.6	63.83 53.49						
+13.66	50.31	+50.30	12.29	+12.25	11.84	+11.80	20.33	+20.31						
54°.030	1 ^h 29 ^m	15°.60	4 ^h 9 ^m	27°.362	5 ^h 34 ^m	35°.250	7 ^h 1 ^m	5°.64						
6''45	+88° 51'	6''49	+85° 19'	51''71	+85° 9'	25''87	+87° 11'	5''45						

[Eph 15]

APPARENT PLACES OF CIRCUMPOLAR STARS

FOR THE UPPER TRANSIT AT WASHINGTON.

43 H. Cephei. Mag. 4.5			α Ursæ Minoris. (Polaris.) Mag. 2.1			Groombridge 750. Mag. 6.7			Groombridge 944. Mag. 6.4			51 H. Cephei. Mag. 5.3	
Mean Solar Date.	Right Ascension.	Declination North.	Mean Solar Date.	Right Ascension.	Declination North.	Mean Solar Date.	Right Ascension.	Declination North.	Mean Solar Date.	Right Ascension.	Declination North.	Mean Solar Date.	Right Ascension.
Dec.	h m 0 57	° +85 48	Dec.	h m 1 29	° +88 51	Dec.	h m 4 10	° +85 20	Dec.	h m 5 35	° +85 9	Dec.	h m 7 2
	s "	"		s "	"		s "	"		s "	"		s "
0.3	8.17	46.93	0.4	76.73	44.80	0.5	1.80	10.27	0.5	11.76	29.48	0.6	3.51
1.3	7.97	47.15	1.4	76.08	45.05	1.5	1.82	10.59	1.5	11.87	29.77	1.6	3.83
2.3	7.79	47.36	2.4	75.50	45.30	2.5	1.86	10.88	2.5	11.99	30.03	2.6	4.16
3.3	7.63	47.58	3.4	74.99	45.56	3.5	1.91	11.17	3.5	12.12	30.28	3.6	4.51
4.3	7.47	47.82	4.4	74.50	45.84	4.5	1.97	11.47	4.5	12.28	30.54	4.6	4.87
5.3	7.30	48.08	5.4	73.99	46.13	5.5	2.04	11.78	5.5	12.44	30.81	5.6	5.26
6.3	7.13	48.36	6.4	73.44	46.44	6.5	2.12	12.12	6.5	12.61	31.09	6.6	5.67
7.3	6.93	48.65	7.4	72.82	46.76	7.5	2.18	12.48	7.5	12.77	31.41	7.6	6.09
8.3	6.70	48.93	8.4	72.09	47.09	8.5	2.21	12.87	8.5	12.92	31.75	8.6	6.50
9.3	6.45	49.19	9.3	71.27	47.40	9.5	2.23	13.26	9.5	13.05	32.11	9.6	6.89
10.3	6.18	49.43	10.3	70.38	47.69	10.5	2.23	13.64	10.5	13.16	32.47	10.6	7.24
11.3	5.90	49.64	11.3	69.44	47.95	11.5	2.20	14.00	11.5	13.25	32.82	11.6	7.55
12.3	5.63	49.83	12.3	68.52	48.18	12.5	2.17	14.34	12.5	13.32	33.16	12.6	7.83
13.3	5.37	49.99	13.3	67.64	48.39	13.4	2.12	14.66	13.5	13.37	33.47	13.6	8.07
14.3	5.13	50.14	14.3	66.82	48.59	14.4	2.08	14.96	14.5	13.43	33.77	14.6	8.30
15.3	4.91	50.29	15.3	66.05	48.78	15.4	2.05	15.25	15.5	13.49	34.06	15.6	8.54
16.3	4.69	50.43	16.3	65.32	48.97	16.4	2.03	15.53	16.5	13.55	34.34	16.6	8.78
17.3	4.48	50.59	17.3	64.60	49.17	17.4	2.01	15.81	17.5	13.62	34.61	17.6	9.03
18.3	4.27	50.77	18.3	63.88	49.38	18.4	2.00	16.10	18.5	13.70	34.90	18.6	9.30
19.3	4.04	50.95	19.3	63.13	49.60	19.4	1.98	16.41	19.5	13.78	35.20	19.6	9.57
20.3	3.81	51.13	20.3	62.33	49.83	20.4	1.96	16.73	20.5	13.86	35.51	20.6	9.86
21.3	3.56	51.32	21.3	61.47	50.06	21.4	1.93	17.07	21.5	13.93	35.84	21.6	10.14
22.3	3.29	51.50	22.3	60.54	50.29	22.4	1.89	17.41	22.5	13.99	36.18	22.6	10.42
23.3	3.00	51.67	23.3	59.55	50.51	23.4	1.83	17.76	23.5	14.04	36.54	23.6	10.67
24.3	2.70	51.81	24.3	58.52	50.72	24.4	1.76	18.11	24.5	14.08	36.90	24.6	10.90
25.3	2.40	51.94	25.3	57.45	50.91	25.4	1.67	18.44	25.5	14.09	37.26	25.6	11.11
26.3	2.10	52.04	26.3	56.37	51.07	26.4	1.56	18.75	26.5	14.10	37.61	26.6	11.29
27.3	1.80	52.13	27.3	55.31	51.21	27.4	1.45	19.05	27.5	14.09	37.94	27.6	11.43
28.3	1.52	52.20	28.3	54.30	51.33	28.4	1.34	19.33	28.5	14.06	38.25	28.6	11.56
29.3	1.26	52.26	29.3	53.34	51.44	29.4	1.23	19.59	29.5	14.05	38.54	29.6	11.68
30.3	1.02	52.32	30.3	52.46	51.55	30.4	1.14	19.84	30.5	14.04	38.81	30.6	11.80
31.3	0.78	52.40	31.3	51.63	51.67	31.4	1.06	20.08	31.5	14.05	39.07	31.6	11.94
13.70	+13.66	50.42	+50.41	12.30	+12.26	11.85	+11.81	20.34	+20.34	7h 1m	5		
0h 56m	54°.030	1h 29m	15°.60	4h 9m	27°.362	5h 34m	35°.250	7h 1m	5				
:85° 48'	6'' .45	+88° 51'	6'' .49	+85° 19'	51'' .71	+85° 9'	25'' .87	+87° 11'	5				

[Eph 15]

APPARENT PLACES OF CIRCUMPOLAR STARS
FOR THE UPPER TRANSIT AT WASHINGTON.

Groombridge 1119. Mag. 7.0			1 H. Draconis. Mag. 4.6			30 H. Camelop. Mag. 5.3			Bradley 1672. Mag. 6.3			Groombridge 2283. Mag. 7.2		
Mean Solar Date.	Right Ascension.	Declination North.	Mean Solar Date.	Right Ascension.	Declination North.	Mean Solar Date.	Right Ascension.	Declination North.	Mean Solar Date.	Right Ascension.	Declination North.	Mean Solar Date.	Right Ascension.	Declination North.
Jan.	h m 8 15	° ' " +88 53	Jan.	h m 9 25	° ' " +81 42	Jan.	h m 10 21	° ' " +82 59	Jan.	h m 12 14	° ' " +88 9	Jan.	h m 15 4	° ' " +87 33
	s "	"		s "	"		s "	"		s "	"		s "	"
0.6	16.44	17.96	0.6	15.29	0.76	0.7	0.83	13.18	0.7	46.87	51.52	0.8	5.27	14.17
1.6	17.26	18.23	1.6	15.44	0.92	1.7	1.03	13.27	1.7	47.61	51.45	1.8	5.62	13.87
2.6	18.05	18.53	2.6	15.60	1.10	2.7	1.23	13.38	2.7	48.39	51.40	2.8	6.02	13.58
3.6	18.80	18.84	3.6	15.75	1.31	3.6	1.43	13.52	3.7	49.20	51.37	3.8	6.44	13.31
4.6	19.48	19.15	4.6	15.89	1.54	4.6	1.62	13.68	4.7	50.00	51.37	4.8	6.89	13.06
5.6	20.06	19.48	5.6	16.01	1.77	5.6	1.80	13.85	5.7	50.76	51.39	5.8	7.34	12.83
6.6	20.53	19.79	6.6	16.12	2.01	6.6	1.97	14.03	6.7	51.48	51.42	6.8	7.79	12.62
7.5	20.95	20.09	7.6	16.23	2.24	7.6	2.12	14.21	7.7	52.15	51.47	7.8	8.21	12.44
8.5	21.33	20.37	8.6	16.33	2.45	8.6	2.25	14.38	8.7	52.77	51.51	8.8	8.60	12.27
9.5	21.72	20.62	9.6	16.43	2.64	9.6	2.39	14.52	9.7	53.35	51.53	9.8	8.96	12.10
10.5	22.14	20.87	10.6	16.52	2.81	10.6	2.53	14.64	10.7	53.92	51.55	10.8	9.30	11.93
11.5	22.63	21.10	11.6	16.62	2.98	11.6	2.67	14.75	11.7	54.51	51.55	11.8	9.64	11.73
12.5	23.17	21.34	12.6	16.74	3.15	12.6	2.83	14.87	12.7	55.15	51.54	12.8	9.99	11.52
13.5	23.75	21.62	13.6	16.86	3.34	13.6	3.00	15.00	13.7	55.82	51.53	13.8	10.37	11.29
14.5	24.33	21.91	14.6	16.98	3.55	14.6	3.17	15.16	14.7	56.56	51.53	14.8	10.79	11.06
15.5	24.88	22.23	15.6	17.11	3.79	15.6	3.35	15.33	15.7	57.32	51.55	15.8	11.25	10.83
16.5	25.38	22.57	16.6	17.23	4.05	16.6	3.52	15.53	16.7	58.09	51.60	16.8	11.74	10.62
17.5	25.78	22.91	17.6	17.34	4.33	17.6	3.68	15.76	17.7	58.85	51.68	17.8	12.26	10.44
18.5	26.06	23.27	18.6	17.43	4.62	18.6	3.83	16.00	18.7	59.57	51.79	18.8	12.78	10.29
19.5	26.27	23.61	19.6	17.51	4.91	19.6	3.96	16.24	19.7	60.26	51.91	19.8	13.30	10.16
20.5	26.42	23.94	20.6	17.59	5.19	20.6	4.08	16.49	20.7	60.90	52.04	20.8	13.79	10.05
21.5	26.53	24.25	21.6	17.66	5.46	21.6	4.19	16.72	21.7	61.49	52.17	21.8	14.26	9.96
22.5	26.61	24.54	22.6	17.72	5.72	22.6	4.30	16.94	22.7	62.06	52.30	22.8	14.71	9.87
23.5	26.72	24.82	23.6	17.78	5.96	23.6	4.41	17.16	23.7	62.61	52.41	23.8	15.15	9.77
24.5	26.83	25.10	24.6	17.85	6.20	24.6	4.51	17.37	24.7	63.16	52.52	24.8	15.58	9.68
25.5	26.99	25.38	25.5	17.91	6.43	25.6	4.62	17.57	25.7	63.72	52.62	25.8	16.00	9.57
26.5	27.19	25.67	26.5	17.99	6.67	26.6	4.73	17.77	26.7	64.30	52.71	26.8	16.43	9.45
27.5	27.39	25.96	27.5	18.06	6.91	27.6	4.85	17.97	27.7	64.91	52.81	27.8	16.88	9.33
28.5	27.61	26.27	28.5	18.14	7.17	28.6	4.98	18.19	28.7	65.55	52.91	28.8	17.36	9.20
29.5	27.82	26.60	29.5	18.22	7.44	29.6	5.11	18.43	29.7	66.22	53.02	29.8	17.86	9.07
30.5	27.99	26.95	30.5	18.30	7.74	30.6	5.24	18.69	30.7	66.90	53.15	30.8	18.39	8.95
31.5	28.09	27.30	31.5	18.37	8.06	31.6	5.37	18.96	31.6	67.58	53.31	31.8	18.94	8.85
51.60 +51.59			6.93 +6.86			8.19 +8.13			31.22 +31.20			23.42 +23.40		
8 ^h 13 ^m 47 ^s .916			9 ^h 25 ^m 4 ^s .133			10 ^h 20 ^m 49 ^s .679			12 ^h 14 ^m 27 ^s .688			15 ^h 4 ^m 20 ^s .10		
+88° 53' 22'' .50			+81° 42' 12'' .85			+82° 59' 30'' .46			+88° 10' 15'' .98			+87° 33' 38'' .31		

[Bph 13]

APPARENT PLACES OF CIRCUMPOLAR STARS
FOR THE UPPER TRANSIT AT WASHINGTON.

Groombridge 1119. Mag. 7.0			1 H. Draconis. Mag. 4.6			30 H. Camelop. Mag. 5.3			Bradley 1672. Mag. 6.3			Groombridge 2223. Mag. 7.2		
Mean Solar Date.	Right Ascension.	Declination North.	Mean Solar Date.	Right Ascension.	Declination North.	Mean Solar Date.	Right Ascension.	Declination North.	Mean Solar Date.	Right Ascension.	Declination North.	Mean Solar Date.	Right Ascension.	Declination North.
	h m	° '		h m	° '		h m	° '		h m	° '		h m	° '
Feb. 8 15		+88 53	Feb. 9 25		+81 42	Feb. 10 21		+82 59	Feb. 12 15		+88 9	Feb. 15 4		+87 33
	s	"		s	"		s	"		s	"		s	"
0.5	28.09	27.30	0.5	18.37	8.06	0.6	5.37	18.96	0.6	7.58	53.31	0.8	18.94	8.85
1.5	28.11	27.66	1.5	18.43	8.38	1.6	5.48	19.26	1.6	8.24	53.49	1.8	19.50	8.78
2.5	28.02	28.01	2.5	18.48	8.71	2.6	5.58	19.56	2.6	8.86	53.69	2.8	20.06	8.73
3.5	27.86	28.35	3.5	18.51	9.04	3.6	5.66	19.86	3.6	9.42	53.90	3.8	20.60	8.71
4.5	27.64	28.67	4.5	18.53	9.34	4.6	5.73	20.16	4.6	9.92	54.11	4.8	21.11	8.70
5.5	27.40	28.96	5.5	18.55	9.62	5.6	5.78	20.43	5.6	10.37	54.31	5.8	21.58	8.71
6.5	27.18	29.23	6.5	18.57	9.87	6.6	5.84	20.67	6.6	10.80	54.50	6.8	22.01	8.71
7.5	27.02	29.49	7.5	18.59	10.12	7.6	5.90	20.90	7.6	11.23	54.67	7.7	22.43	8.70
8.5	26.93	29.75	8.5	18.62	10.36	8.5	5.97	21.13	8.6	11.68	54.82	8.7	22.85	8.67
9.5	26.88	30.02	9.5	18.66	10.62	9.5	6.05	21.36	9.6	12.17	54.97	9.7	23.29	8.61
10.5	26.85	30.31	10.5	18.70	10.89	10.5	6.14	21.60	10.6	12.71	55.12	10.7	23.76	8.55
11.5	26.80	30.63	11.5	18.75	11.18	11.5	6.23	21.87	11.6	13.28	55.29	11.7	24.27	8.50
12.4	26.69	30.97	12.5	18.79	11.50	12.5	6.32	22.17	12.6	13.87	55.50	12.7	24.82	8.46
13.4	26.50	31.31	13.5	18.82	11.83	13.5	6.40	22.48	13.6	14.44	55.73	13.7	25.38	8.45
14.4	26.21	31.66	14.5	18.84	12.18	14.5	6.46	22.81	14.6	14.97	55.97	14.7	25.95	8.46
15.4	25.84	32.00	15.5	18.85	12.52	15.5	6.51	23.15	15.6	15.47	56.24	15.7	26.51	8.50
16.4	25.38	32.32	16.5	18.84	12.85	16.5	6.55	23.47	16.6	15.91	56.51	16.7	27.05	8.57
17.4	24.89	32.62	17.5	18.83	13.17	17.5	6.58	23.80	17.6	16.30	56.79	17.7	27.56	8.65
18.4	24.37	32.91	18.5	18.81	13.47	18.5	6.59	24.11	18.6	16.66	57.07	18.7	28.04	8.74
19.4	23.86	33.18	19.5	18.79	13.76	19.5	6.61	24.41	19.6	16.98	57.33	19.7	28.50	8.82
20.4	23.35	33.43	20.5	18.76	14.03	20.5	6.62	24.69	20.6	17.30	57.58	20.7	28.94	8.91
21.4	22.88	33.67	21.5	18.75	14.30	21.5	6.64	24.97	21.6	17.62	57.82	21.7	29.38	8.99
22.4	22.45	33.92	22.5	18.73	14.57	22.5	6.65	25.23	22.6	17.95	58.05	22.7	29.81	9.05
23.4	22.04	34.17	23.5	18.73	14.84	23.5	6.67	25.50	23.6	18.29	58.28	23.7	30.25	9.11
24.4	21.67	34.44	24.5	18.72	15.11	24.5	6.71	25.78	24.6	18.67	58.51	24.7	30.71	9.16
25.4	21.29	34.72	25.5	18.72	15.40	25.5	6.75	26.07	25.6	19.07	58.75	25.7	31.19	9.21
26.4	20.89	35.01	26.5	18.71	15.70	26.5	6.78	26.37	26.6	19.49	59.00	26.7	31.69	9.25
27.4	20.44	35.31	27.5	18.70	16.02	27.5	6.81	26.69	27.6	19.90	59.27	27.7	32.21	9.32
28.4	19.90	35.62	28.5	18.68	16.35	28.5	6.83	27.03	28.6	20.30	59.56	28.7	32.75	9.42
29.4	19.28	35.92	29.5	18.65	16.68	29.5	6.84	27.38	29.6	20.66	59.87	29.7	33.27	9.53
30.4	18.58	36.21	30.4	18.60	17.01	30.5	6.83	27.72	30.6	20.96	60.19	30.7	33.78	9.68
31.4	17.81	36.47	31.4	18.54	17.32	31.5	6.81	28.06	31.6	21.19	60.52	31.7	34.25	9.84
51.72	+51.72	6.93	+6.86	8.19	+8.13	31.24	+31.22	23.42	+23.39					
8 ^h 13 ^m	47 ^h 916	9 ^h 25 ^m	4 ^h 133	10 ^h 20 ^m	49 ^h 679	12 ^h 14 ^m	27 ^h 688	15 ^h 4 ^m	20 ^h 10					
+88° 53'	22'' 50	+81° 42'	12'' 85	+82° 59'	30'' 46	+88° 10'	15'' 98	+87° 33'	38'' 31					

(Eph 15)

APPARENT PLACES OF CIRCUMPOLAR STARS

FOR THE UPPER TRANSIT AT WASHINGTON.

Greenbridge 1119. Mag. 7.0			1 H. Draconis. Mag. 4.6			30 H. Camelop. Mag. 5.3			Bradley 1672. Mag. 6.3			Groombridge 2283. Mag. 7.2		
Mean Solar Date.	Right Ascension.	Declination North.	Mean Solar Date.	Right Ascension.	Declination North.	Mean Solar Date.	Right Ascension.	Declination North.	Mean Solar Date.	Right Ascension.	Declination North.	Mean Solar Date.	Right Ascension.	Declination North.
Mar. 8 14	h m 8 14	° ' s +88 53	Mar. 9 25	h m 9 25	° ' s +81 42	Mar. 10 21	h m 10 21	° ' s +82 59	Mar. 12 15	h m 12 15	° ' s +88 9	Mar. 15 4	h m 15 4	° ' s +87 33
0.4	79.90	35.62	0.5	18.68	16.35	0.5	6.83	27.03	0.6	20.30	59.56	0.7	32.75	9.42
1.4	79.28	35.92	1.5	18.65	16.68	1.5	6.84	27.38	1.6	20.66	59.87	1.7	33.27	9.53
2.4	78.58	36.21	2.4	18.60	17.01	2.5	6.83	27.72	2.6	20.96	60.19	2.7	33.78	9.68
3.4	77.81	36.47	3.4	18.54	17.32	3.5	6.81	28.06	3.6	21.19	60.52	3.7	34.25	9.84
4.4	77.00	36.71	4.4	18.48	17.60	4.5	6.77	28.37	4.6	21.37	60.84	4.7	34.67	10.02
5.4	76.22	36.92	5.4	18.42	17.86	5.5	6.74	28.66	5.6	21.52	61.14	5.7	35.06	10.20
6.4	75.48	37.11	6.4	18.36	18.10	6.5	6.69	28.93	6.6	21.64	61.41	6.7	35.43	10.36
7.4	74.80	37.29	7.4	18.30	18.32	7.5	6.66	29.18	7.6	21.77	61.67	7.7	35.78	10.51
8.4	74.19	37.48	8.4	18.26	18.55	8.5	6.64	29.43	8.6	21.95	61.92	8.7	36.15	10.63
9.4	73.62	37.69	9.4	18.22	18.79	9.5	6.63	29.69	9.5	22.16	62.17	9.7	36.54	10.75
10.4	73.06	37.91	10.4	18.18	19.05	10.5	6.62	29.96	10.5	22.41	62.43	10.7	36.95	10.87
11.4	72.44	38.16	11.4	18.14	19.33	11.5	6.61	30.26	11.5	22.67	62.70	11.7	37.39	10.99
12.4	71.76	38.41	12.4	18.10	19.63	12.5	6.60	30.58	12.5	22.93	63.00	12.7	37.86	11.14
13.4	71.00	38.67	13.4	18.04	19.93	13.5	6.57	30.91	13.5	23.16	63.32	13.7	38.34	11.31
14.4	70.15	38.92	14.4	17.97	20.24	14.5	6.53	31.24	14.5	23.35	63.66	14.7	38.80	11.50
15.4	69.23	39.15	15.4	17.89	20.54	15.5	6.47	31.58	15.5	23.49	64.01	15.6	39.24	11.72
16.4	68.26	39.35	16.4	17.80	20.81	16.5	6.41	31.90	16.5	23.57	64.36	16.6	39.65	11.95
17.4	67.26	39.54	17.4	17.70	21.07	17.4	6.33	32.21	17.5	23.59	64.71	17.6	40.03	12.20
18.4	66.28	39.71	18.4	17.60	21.31	18.4	6.25	32.50	18.5	23.60	65.04	18.6	40.38	12.45
19.4	65.31	39.86	19.4	17.51	21.53	19.4	6.17	32.77	19.5	23.58	65.36	19.6	40.71	12.69
20.4	64.37	39.99	20.4	17.42	21.74	20.4	6.09	33.02	20.5	23.56	65.66	20.6	41.02	12.92
21.3	63.48	40.13	21.4	17.33	21.95	21.4	6.01	33.27	21.5	23.54	65.95	21.6	41.32	13.14
22.3	62.63	40.26	22.4	17.25	22.15	22.4	5.94	33.52	22.5	23.54	66.23	22.6	41.62	13.35
23.3	61.81	40.40	23.4	17.17	22.35	23.4	5.88	33.76	23.5	23.55	66.51	23.6	41.93	13.55
24.3	60.99	40.56	24.4	17.09	22.57	24.4	5.82	34.02	24.5	23.60	66.79	24.6	42.25	13.74
25.3	60.20	40.73	25.4	17.02	22.80	25.4	5.76	34.28	25.5	23.67	67.07	25.6	42.59	13.94
26.3	59.36	40.90	26.4	16.94	23.04	26.4	5.71	34.55	26.5	23.73	67.37	26.6	42.95	14.14
27.3	58.46	41.09	27.4	16.85	23.30	27.4	5.65	34.84	27.5	23.78	67.69	27.6	43.32	14.37
28.3	57.51	41.27	28.4	16.76	23.55	28.4	5.57	35.14	28.5	23.81	68.02	28.6	43.68	14.61
29.3	56.45	41.43	29.4	16.65	23.79	29.4	5.48	35.43	29.5	23.78	68.37	29.6	44.02	14.88
30.3	55.35	41.56	30.4	16.54	24.01	30.4	5.38	35.71	30.5	23.69	68.72	30.6	44.34	15.17
31.3	54.21	41.67	31.4	16.42	24.22	31.4	5.25	35.98	31.5	23.53	69.06	31.6	44.61	15.48
32.3	53.02	41.78	32.4	16.30	24.43	32.4	5.12	36.25	32.5	23.38	69.38	32.6	44.88	15.79
33.3	51.78	41.88	33.4	16.18	24.63	33.4	5.00	36.51	33.5	23.23	69.70	33.6	45.15	16.10
34.3	50.49	41.97	34.4	16.06	24.83	34.4	4.88	36.77	34.5	23.08	70.02	34.6	45.42	16.41
35.3	49.15	42.06	35.4	15.94	25.03	35.4	4.77	37.03	35.5	22.93	70.34	35.6	45.69	16.72
36.3	47.77	42.15	36.4	15.82	25.23	36.4	4.66	37.29	36.5	22.78	70.66	36.6	45.96	17.03
37.3	46.35	42.24	37.4	15.70	25.43	37.4	4.56	37.55	37.5	22.63	70.98	37.6	46.23	17.34
38.3	44.89	42.33	38.4	15.58	25.63	38.4	4.46	37.81	38.5	22.48	71.30	38.6	46.50	17.65
39.3	43.40	42.42	39.4	15.46	25.83	39.4	4.37	38.07	39.5	22.33	71.62	39.6	46.77	17.96
40.3	41.88	42.51	40.4	15.34	26.03	40.4	4.28	38.33	40.5	22.18	71.94	40.6	47.04	18.27
41.3	40.33	42.60	41.4	15.22	26.23	41.4	4.19	38.59	41.5	22.03	72.26	41.6	47.31	18.58
42.3	38.75	42.69	42.4	15.10	26.43	42.4	4.10	38.85	42.5	21.88	72.58	42.6	47.58	18.89
43.3	37.15	42.78	43.4	14.98	26.63	43.4	4.02	39.11	43.5	21.73	72.90	43.6	47.85	19.20
44.3	35.53	42.87	44.4	14.86	26.83	44.4	3.94	39.37	44.5	21.58	73.22	44.6	48.12	19.51
45.3	33.89	42.96	45.4	14.74	27.03	45.4	3.86	39.63	45.5	21.43	73.54	45.6	48.39	19.82
46.3	32.23	43.05	46.4	14.62	27.23	46.4	3.78	39.89	46.5	21.28	73.86	46.6	48.66	20.13
47.3	30.55	43.14	47.4	14.50	27.43	47.4	3.70	40.15	47.5	21.13	74.18	47.6	48.93	20.44
48.3	28.85	43.23	48.4	14.38	27.63	48.4	3.62	40.41	48.5	20.98	74.50	48.6	49.20	20.75
49.3	27.13	43.32	49.4	14.26	27.83	49.4	3.55	40.67	49.5	20.83	74.82	49.6	49.47	21.06
50.3	25.39	43.41	50.4	14.14	28.03	50.4	3.48	40.93	50.5	20.68	75.14	50.6	49.74	21.37
51.3	23.63	43.50	51.4	14.02	28.23	51.4	3.41	41.19	51.5	20.53	75.46	51.6	49.99	21.68
52.3	21.85	43.59	52.4	13.90	28.43	52.4	3.34	41.45	52.5	20.38	75.78	52.6	50.26	21.99
53.3	20.06	43.68	53.4	13.78	28.63	53.4	3.27	41.71	53.5	20.23	76.10	53.6	50.53	22.30
54.3	18.26	43.77	54.4	13.66	28.83	54.4	3.20	41.97	54.5	20.08	76.42	54.6	50.80	22.61
55.3	16.45	43.86	55.4	13.54	29.03	55.4	3.13	42.23	55.5	19.93	76.74	55.6	51.07	22.92
56.3	14.63	43.95	56.4	13.42	29.23	56.4	3.06	42.49	56.5	19.78	77.06	56.6	51.34	23.23
57.3	12.80	44.04	57.4	13.30	29.43	57.4	2.99	42.75	57.5	19.63	77.38	57.6	51.61	23.54
58.3	10.96	44.13	58.4	13.18	29.63	58.4	2.92	43.01	58.5	19.48	77.70	58.6	51.88	23.85
59.3	9.11	44.22	59.4	13.06	29.83	59.4	2.85	43.27	59.5	19.33	78.02	59.6	52.15	24.16
60.3	7.25	44.31	60.4	12.94	30.03	60.4	2.78	43.53	60.5	19.18	78.34	60.6	52.42	24.47
61.3	5.39	44.40	61.4	12.82	30.23	61.4	2.71	43.79	61.5	19.03	78.66	61.6	52.69	24.78
62.3	3.52	44.49	62.4	12.70	30.43	62.4	2.64	44.05	62.5	18.88	78.98	62.6	52.96	25.09
63.3	1.65	44.58	63.4	12.58	30.63	63.4	2.57	44.31	63.5	18.73	79.30	63.6	53.23	25.40
64.3	-0.21	44.67	64.4	12.46	30.83	64.4	2.50	44.57	64.5	18.58	79.62	64.6	53.50	25.71
65.3	-1.97	44.76	65.4	12.34	31.03	65.4	2.43	44.83	65.5	18.43	79.94	65.6	53.77	26.02
66.3	-3.73	44.85	66.4	12.22	31.23	66.4	2.36	45.09	66.5	18.28	80.26	66.6	54.04	26.33
67.3	-5.49	44.94	67.4	12.10	31.43	67.4	2.29	45.35	67.5	18.13	80.58	67.6	54.31	26.64
68.3	-7.25	45.03	68.4	11.98	31.63	68.4	2.22	45.61	68.5	17.98	80.90	68.6	54.58	26.95
69.3	-9.01	45.12	69.4	11.86	31.83	69.4	2.15	45.87	69.5	17.83	81.22	69.6	54.85	27.26
70.3	-10.77	45.21	70.4	11.74	32.03	70.4	2.08	46.13	70.5	17.68	81.54	70.6	55.12	27.57
71.3	-12.53	45.30	71.4	11.62	32.23	71.4	2.01	46.39	71.5	17.53	81.86	71.6	55.39	27.88
72.3	-14.29	45.39	72.4	11.50	32.43	72.4	1.94	46.65	72.5	17.38	82.18	72.6	55.66	28.19
73.3	-16.05	45.48	73.4	11.38	32.63	73.4	1.87	46.91	73.5	17.23	82.50	73.6	55.93	28.50
74.3	-17.81	45.57	74.4	11.26	32.83	74.4	1.80	47.17	74.5	17.08	82.82	74.6	56.20	28.81
75.3	-19.57	45.66	75.4	11.14	33.03	75.4	1.73	47.43	75.5	16.93	83.14	75.6	56.47	29.12
76.3	-21.33	45.75	76.4	11.02	33.23	76.4	1.66	47.69	76.5	16.78	83.46	76.6	56.74	29.43
77.3	-23.09	45.84	77.4	10.90	33.43	77.4	1.59	47.95	77.5					

APPARENT PLACES OF CIRCUMPOLAR STARS

FOR THE UPPER TRANSIT AT WASHINGTON.

Groombridge 1119. Mag. 7.0			1 H. Draconis. Mag. 4.6			30 H. Camelop. Mag. 5.3			Bradley 1672. Mag. 6.3			Groombridge Mag. 7.	
Mean Solar Date.	Right Ascension.	Declination North.	Mean Solar Date.	Right Ascension.	Declination North.	Mean Solar Date.	Right Ascension.	Declination North.	Mean Solar Date.	Right Ascension.	Declination North.	Mean Solar Date.	Right Ascension.
Apr.	h m 8 14	° ' s +88 53	Apr.	h m 9 25	° ' s +81 42	Apr.	h m 10 21	° ' s +82 59	Apr.	h m 12 15	° ' s +88 10	Apr.	h m 15 4
0.3	54.21	41.67	0.4	16.42	24.22	0.4	5.25	35.98	0.5	23.53	9.06	0.6	44.61
1.3	53.08	41.75	1.4	16.29	24.39	1.4	5.13	36.22	1.5	23.34	9.39	1.6	44.84
2.3	51.98	41.80	2.4	16.16	24.54	2.4	5.00	36.43	2.5	23.11	9.69	2.6	45.02
3.3	50.97	41.83	3.4	16.05	24.67	3.4	4.88	36.62	3.5	22.88	9.97	3.6	45.19
4.3	50.02	41.88	4.4	15.94	24.80	4.4	4.77	36.80	4.5	22.68	10.22	4.6	45.36
5.3	49.15	41.93	5.4	15.84	24.93	5.4	4.68	36.98	5.5	22.53	10.47	5.6	45.54
6.3	48.29	42.00	6.4	15.75	25.07	6.4	4.59	37.18	6.5	22.41	10.72	6.6	45.74
7.3	47.41	42.10	7.4	15.66	25.24	7.4	4.50	37.39	7.5	22.32	10.99	7.6	45.98
8.3	46.50	42.20	8.3	15.56	25.42	8.4	4.42	37.63	8.5	22.24	11.28	8.6	46.24
9.3	45.51	42.31	9.3	15.45	25.61	9.4	4.32	37.87	9.5	22.13	11.59	9.6	46.51
10.3	44.45	42.41	10.3	15.33	25.81	10.4	4.21	38.12	10.5	21.99	11.91	10.6	46.77
11.3	43.30	42.50	11.3	15.21	25.99	11.4	4.09	38.37	11.5	21.80	12.24	11.6	47.01
12.3	42.13	42.56	12.3	15.07	26.16	12.4	3.95	38.60	12.5	21.55	12.57	12.6	47.21
13.3	40.93	42.60	13.3	14.94	26.31	13.4	3.80	38.82	13.5	21.25	12.89	13.6	47.38
14.3	39.72	42.62	14.3	14.79	26.43	14.4	3.65	39.02	14.5	20.92	13.20	14.6	47.53
15.3	38.56	42.61	15.3	14.65	26.54	15.4	3.50	39.20	15.4	20.56	13.49	15.6	47.64
16.3	37.43	42.60	16.3	14.51	26.63	16.4	3.35	39.36	16.4	20.20	13.77	16.6	47.73
17.3	36.35	42.57	17.3	14.38	26.71	17.4	3.21	39.51	17.4	19.84	14.03	17.6	47.80
18.3	35.34	42.55	18.3	14.25	26.79	18.4	3.08	39.65	18.4	19.49	14.28	18.6	47.87
19.3	34.36	42.53	19.3	14.12	26.86	19.4	2.94	39.79	19.4	19.17	14.51	19.6	47.94
20.3	33.41	42.52	20.3	14.01	26.94	20.4	2.82	39.93	20.4	18.87	14.75	20.6	48.03
21.3	32.48	42.51	21.3	13.90	27.03	21.4	2.70	40.08	21.4	18.60	14.98	21.5	48.13
22.3	31.53	42.52	22.3	13.78	27.12	22.3	2.58	40.24	22.4	18.34	15.23	22.5	48.25
23.3	30.56	42.54	23.3	13.67	27.23	23.3	2.46	40.40	23.4	18.07	15.49	23.5	48.38
24.3	29.53	42.55	24.3	13.55	27.34	24.3	2.34	40.58	24.4	17.78	15.76	24.5	48.51
25.3	28.43	42.55	25.3	13.41	27.45	25.3	2.19	40.76	25.4	17.45	16.04	25.5	48.62
26.2	27.28	42.54	26.3	13.27	27.55	26.3	2.03	40.93	26.4	17.07	16.33	26.5	48.70
27.2	26.08	42.49	27.3	13.12	27.62	27.3	1.86	41.08	27.4	16.63	16.61	27.5	48.75
28.2	24.91	42.42	28.3	12.97	27.66	28.3	1.69	41.20	28.4	16.13	16.87	28.5	48.74
29.2	23.77	42.32	29.3	12.82	27.67	29.3	1.52	41.29	29.4	15.60	17.10	29.5	48.69
30.2	22.70	42.20	30.3	12.67	27.66	30.3	1.35	41.36	30.4	15.07	17.31	30.5	48.62
31.2	21.72	42.07	31.3	12.54	27.64	31.3	1.19	41.41	31.4	14.55	17.49	31.5	48.54
51.86 +51.85			6.93 +6.86			8.20 +8.14			31.32 +31.30			23.44	
8 ^h 13 ^m 47 ^s .916			9 ^h 25 ^m 4 ^s .133			10 ^h 20 ^m 49 ^s .679			12 ^h 14 ^m 27 ^s .688			15 ^h 4 ^m	
+88° 53' 22".50			+81° 42' 12".85			+82° 59' 30".46			+88° 10' 15".98			+87° 33'	

APPARENT PLACES OF CIRCUMPOLAR STARS
FOR THE UPPER TRANSIT AT WASHINGTON.

Groombridge 1119. Mag. 7.0			1 H. Draconis. Mag. 4.6			30 H. Camelop. Mag. 5.3			Bradley 1672. Mag. 6.3			Groombridge 2283. Mag. 7.2		
Mean Solar Date.	Right Ascension.	Declination North.	Mean Solar Date.	Right Ascension.	Declination North.	Mean Solar Date.	Right Ascension.	Declination North.	Mean Solar Date.	Right Ascension.	Declination North.	Mean Solar Date.	Right Ascension.	Declination North.
	h m	° ' "		h m	° ' "		h m	° ' "		h m	° ' "		h m	° ' "
May 8 13	+88 53		May 9 25	+81 42		May 10 20	+82 59		May 12 14	+88 10		May 15 4	+87 33	
	s	"		s	"		s	"		s	"		s	"
0.2	82.70	42.20	0.3	12.67	27.66	0.3	61.35	41.36	0.4	75.07	17.31	0.5	48.62	24.40
1.2	81.72	42.07	1.3	12.54	27.64	1.3	61.19	41.41	1.4	74.55	17.49	1.5	48.54	24.71
2.2	80.83	41.95	2.3	12.41	27.62	2.3	61.04	41.45	2.4	74.09	17.66	2.5	48.45	24.99
3.2	79.98	41.84	3.3	12.29	27.60	3.3	60.91	41.50	3.4	73.66	17.83	3.5	48.38	25.26
4.2	79.15	41.76	4.3	12.18	27.61	4.3	60.78	41.57	4.4	73.27	18.00	4.5	48.36	25.51
5.2	78.30	41.70	5.3	12.07	27.64	5.3	60.65	41.66	5.4	72.90	18.19	5.5	48.36	25.78
6.2	77.39	41.64	6.3	11.95	27.67	6.3	60.52	41.76	6.4	72.52	18.39	6.5	48.37	26.06
7.2	76.41	41.58	7.3	11.83	27.72	7.3	60.38	41.87	7.4	72.12	18.62	7.5	48.39	26.36
8.2	75.36	41.51	8.3	11.70	27.76	8.3	60.22	41.98	8.4	71.67	18.85	8.5	48.38	26.69
9.2	74.25	41.42	9.3	11.55	27.78	9.3	60.06	42.08	9.4	71.17	19.09	9.5	48.35	27.03
10.2	73.15	41.31	10.3	11.40	27.79	10.3	59.88	42.16	10.4	70.62	19.31	10.5	48.29	27.37
11.2	72.04	41.17	11.3	11.24	27.77	11.3	59.69	42.23	11.4	70.04	19.53	11.5	48.19	27.73
12.2	70.97	41.02	12.3	11.10	27.72	12.3	59.51	42.27	12.4	69.43	19.72	12.5	48.06	28.07
13.2	69.95	40.85	13.3	10.95	27.66	13.3	59.33	42.28	13.4	68.81	19.90	13.5	47.90	28.40
14.2	68.98	40.67	14.2	10.81	27.59	14.3	59.16	42.28	14.4	68.20	20.06	14.5	47.72	28.71
15.2	68.07	40.49	15.2	10.68	27.51	15.3	58.99	42.28	15.4	67.60	20.20	15.5	47.54	29.01
16.2	67.23	40.30	16.2	10.55	27.44	16.3	58.83	42.27	16.4	67.02	20.33	16.5	47.36	29.29
17.2	66.43	40.13	17.2	10.44	27.36	17.3	58.68	42.26	17.4	66.48	20.45	17.5	47.18	29.56
18.2	65.66	39.98	18.2	10.32	27.28	18.3	58.54	42.26	18.4	65.97	20.56	18.5	47.02	29.82
19.2	64.89	39.83	19.2	10.21	27.22	19.3	58.40	42.26	19.4	65.48	20.68	19.5	46.89	30.08
20.2	64.11	39.68	20.2	10.11	27.18	20.3	58.27	42.28	20.4	65.00	20.82	20.5	46.76	30.34
21.2	63.30	39.55	21.2	9.99	27.14	21.3	58.12	42.30	21.3	64.51	20.96	21.5	46.64	30.61
22.2	62.42	39.40	22.2	9.86	27.09	22.3	57.97	42.32	22.3	63.98	21.11	22.5	46.51	30.90
23.2	61.50	39.25	23.2	9.73	27.04	23.3	57.81	42.34	23.3	63.40	21.27	23.5	46.37	31.21
24.2	60.55	39.07	24.2	9.60	26.97	24.3	57.64	42.35	24.3	62.78	21.43	24.5	46.19	31.52
25.2	59.60	38.86	25.2	9.46	26.87	25.3	57.46	42.33	25.3	62.11	21.57	25.5	45.96	31.85
26.2	58.67	38.62	26.2	9.32	26.74	26.3	57.27	42.27	26.3	61.40	21.68	26.5	45.68	32.17
27.2	57.81	38.36	27.2	9.18	26.58	27.3	57.09	42.19	27.3	60.67	21.76	27.5	45.37	32.47
28.2	57.06	38.09	28.2	9.06	26.41	28.3	56.92	42.10	28.3	59.96	21.82	28.4	45.04	32.74
29.2	56.39	37.82	29.2	8.94	26.24	29.2	56.77	41.99	29.3	59.29	21.86	29.4	44.71	32.98
30.2	55.80	37.58	30.2	8.84	26.07	30.2	56.63	41.88	30.3	58.67	21.89	30.4	44.40	33.21
31.2	55.27	37.34	31.2	8.74	25.91	31.2	56.50	41.78	31.3	58.10	21.92	31.4	44.11	33.42
51.84 +51.83			6.93 +6.86			8.20 +8.14			31.35 +31.34			23.47 +23.45		
8 ^h 13 ^m			9 ^h 25 ^m			10 ^h 20 ^m			12 ^h 14 ^m			15 ^h 4 ^m		
+88° 53'			+81° 42'			+82° 59'			+88° 10'			+87° 33'		

[Eph 13]

APPARENT PLACES OF CIRCUMPOLAR STARS

FOR THE UPPER TRANSIT AT WASHINGTON.

Groombridge 1119. Mag. 7.0			1 H. Draconis. Mag. 4.6			30 H. Camelop. Mag. 5.3			Bradley 1672. Mag. 6.3			Groombridge Mag. 7.0	
Mean Solar Date.	Right Ascension.	Declination North.	Mean Solar Date.	Right Ascension.	Declination North.	Mean Solar Date.	Right Ascension.	Declination North.	Mean Solar Date.	Right Ascension.	Declination North.	Mean Solar Date.	Right Ascension.
	h m	° '		h m	° '		h m	° '		h m	° '		h m
June	8 13	+88 53	June	9 25	+81 42	June	10 20	+82 59	June	12 14	+88 10	June	15 4
	s	"		s	"		s	"		s	"		s
0.2	55.27	37.34	0.2	8.74	25.91	0.2	56.50	41.78	0.3	58.10	21.92	0.4	44.11
1.2	54.73	37.13	1.2	8.64	25.78	1.2	56.37	41.70	1.3	57.56	21.95	1.4	43.86
2.1	54.14	36.93	2.2	8.55	25.66	2.2	56.24	41.64	2.3	57.03	22.01	2.4	43.64
3.1	53.50	36.73	3.2	8.46	25.55	3.2	56.11	41.59	3.3	56.49	22.09	3.4	43.42
4.1	52.80	36.53	4.2	8.35	25.44	4.2	55.97	41.54	4.3	55.91	22.17	4.4	43.18
5.1	52.04	36.32	5.2	8.23	25.32	5.2	55.81	41.49	5.3	55.29	22.26	5.4	42.93
6.1	51.26	36.09	6.2	8.10	25.18	6.2	55.65	41.42	6.3	54.63	22.35	6.4	42.65
7.1	50.48	35.84	7.2	7.97	25.02	7.2	55.47	41.34	7.3	53.92	22.42	7.4	42.33
8.1	49.72	35.56	8.2	7.85	24.84	8.2	55.30	41.24	8.3	53.19	22.48	8.4	41.99
9.1	49.03	35.27	9.2	7.74	24.65	9.2	55.14	41.11	9.3	52.45	22.51	9.4	41.61
10.1	48.39	34.96	10.2	7.62	24.44	10.2	54.97	40.96	10.3	51.73	22.52	10.4	41.22
11.1	47.82	34.66	11.2	7.52	24.22	11.2	54.81	40.80	11.3	51.02	22.52	11.4	40.82
12.1	47.33	34.36	12.2	7.42	23.99	12.2	54.67	40.63	12.3	50.33	22.50	12.4	40.41
13.1	46.87	34.06	13.2	7.33	23.77	13.2	54.54	40.47	13.3	49.67	22.47	13.4	40.02
14.1	46.48	33.78	14.2	7.25	23.56	14.2	54.42	40.31	14.3	49.05	22.44	14.4	39.65
15.1	46.10	33.52	15.2	7.17	23.36	15.2	54.30	40.16	15.3	48.46	22.41	15.4	39.29
16.1	45.72	33.26	16.2	7.10	23.17	16.2	54.18	40.02	16.3	47.89	22.38	16.4	38.95
17.1	45.32	33.02	17.2	7.02	22.99	17.2	54.06	39.88	17.3	47.31	22.36	17.4	38.62
18.1	44.87	32.77	18.2	6.94	22.82	18.2	53.94	39.76	18.3	46.73	22.36	18.4	38.30
19.1	44.37	32.52	19.2	6.85	22.64	19.2	53.81	39.64	19.3	46.11	22.37	19.4	37.97
20.1	43.84	32.24	20.1	6.74	22.44	20.2	53.67	39.50	20.3	45.45	22.38	20.4	37.60
21.1	43.29	31.94	21.1	6.64	22.22	21.2	53.52	39.34	21.3	44.73	22.37	21.4	37.19
22.1	42.77	31.62	22.1	6.54	21.98	22.2	53.36	39.16	22.3	43.98	22.35	22.4	36.74
23.1	42.30	31.27	23.1	6.44	21.71	23.2	53.21	38.95	23.3	43.21	22.29	23.4	36.25
24.1	41.94	30.90	24.1	6.35	21.42	24.2	53.06	38.71	24.3	42.45	22.20	24.4	35.74
25.1	41.67	30.54	25.1	6.27	21.12	25.2	52.93	38.46	25.3	41.72	22.09	25.4	35.23
26.1	41.51	30.19	26.1	6.22	20.82	26.2	52.82	38.20	26.3	41.04	21.96	26.4	34.72
27.1	41.41	29.86	27.1	6.17	20.54	27.2	52.72	37.96	27.3	40.43	21.83	27.4	34.24
28.1	41.31	29.55	28.1	6.12	20.27	28.2	52.63	37.74	28.3	39.85	21.71	28.4	33.80
29.1	41.21	29.26	29.1	6.08	20.03	29.2	52.54	37.53	29.3	39.30	21.60	29.4	33.39
30.1	41.04	28.98	30.1	6.02	19.79	30.2	52.44	37.33	30.3	38.74	21.50	30.4	32.99
31.1	40.84	28.71	31.1	5.97	19.57	31.2	52.34	37.15	31.3	38.17	21.43	31.4	32.59
51.74	+51.74	6.93	+6.86	8.20	+8.14	31.36	+31.35	23.49					
8 ^h 13 ^m	47°.916	9 ^h 25 ^m	4°.133	10 ^h 20 ^m	49°.679	12 ^h 14 ^m	27°.688	15 ^h 4 ^m					
+88° 53'	22'' .50	+81° 42'	12'' .85	+82° 59'	30'' .46	+88° 10'	15'' .98	+87° 33'					

[Eph 15]

APPARENT PLACES OF CIRCUMPOLAR STARS
FOR THE UPPER TRANSIT AT WASHINGTON.

Greenbridge 1119. Mag. 7.0			1 H. Draconis. Mag. 4.6			30 H. Camelop. Mag. 5.3			Bradley 1873. Mag. 6.3			Groombridge 2283. Mag. 7.2		
Mean Solar Date.	Right Ascension.	Declination North.	Mean Solar Date.	Right Ascension.	Declination North.	Mean Solar Date.	Right Ascension.	Declination North.	Mean Solar Date.	Right Ascension.	Declination North.	Mean Solar Date.	Right Ascension.	Declination North.
July	h m 8 13	° ' +88 53	July	h m 9 25	° ' +81 42	July	h m 10 20	° ' +82 59	July	h m 12 14	° ' +88 10	July	h m 15 4	° ' +87 33
	s "	"		s "	"		s "	"		s "	"		s "	"
1.1	40.84	28.71	1.1	5.97	19.57	1.2	52.34	37.15	1.2	38.17	21.43	1.4	32.59	39.68
2.1	40.56	28.43	2.1	5.90	19.34	2.2	52.23	36.96	2.2	37.57	21.37	2.4	32.19	39.83
3.1	40.25	28.12	3.1	5.83	19.10	3.2	52.11	36.77	3.2	36.92	21.30	3.3	31.76	39.99
4.1	39.94	27.80	4.1	5.75	18.84	4.1	51.98	36.56	4.2	36.23	21.22	4.3	31.29	40.16
5.1	39.63	27.45	5.1	5.67	18.56	5.1	51.85	36.33	5.2	35.52	21.13	5.3	30.80	40.33
6.1	39.38	27.10	6.1	5.60	18.25	6.1	51.72	36.07	6.2	34.80	21.02	6.3	30.27	40.49
7.1	39.20	26.73	7.1	5.53	17.94	7.1	51.60	35.80	7.2	34.08	20.89	7.3	29.73	40.62
8.0	39.08	26.37	8.1	5.48	17.61	8.1	51.49	35.52	8.2	33.38	20.73	8.3	29.19	40.74
9.0	39.05	26.00	9.1	5.43	17.29	9.1	51.39	35.23	9.2	32.71	20.57	9.3	28.64	40.84
10.0	39.07	25.64	10.1	5.39	16.97	10.1	51.30	34.94	10.2	32.08	20.39	10.3	28.11	40.92
11.0	39.14	25.30	11.1	5.37	16.66	11.1	51.22	34.66	11.2	31.49	20.20	11.3	27.59	40.98
12.0	39.25	24.96	12.1	5.34	16.36	12.1	51.15	34.38	12.2	30.93	20.01	12.3	27.09	41.03
13.0	39.37	24.65	13.1	5.32	16.07	13.1	51.09	34.12	13.2	30.40	19.84	13.3	26.61	41.07
14.0	39.47	24.35	14.1	5.30	15.79	14.1	51.02	33.86	14.2	29.88	19.67	14.3	26.15	41.12
15.0	39.53	24.05	15.1	5.28	15.52	15.1	50.95	33.61	15.2	29.36	19.52	15.3	25.69	41.18
16.0	39.54	23.76	16.1	5.25	15.26	16.1	50.87	33.37	16.2	28.82	19.37	16.3	25.24	41.26
17.0	39.51	23.45	17.1	5.21	14.98	17.1	50.78	33.12	17.2	28.24	19.22	17.3	24.77	41.35
18.0	39.46	23.11	18.1	5.16	14.69	18.1	50.69	32.86	18.2	27.62	19.08	18.3	24.26	41.45
19.0	39.40	22.74	19.1	5.11	14.37	19.1	50.59	32.58	19.2	26.95	18.92	19.3	23.71	41.55
20.0	39.40	22.36	20.1	5.07	14.03	20.1	50.49	32.27	20.2	26.27	18.73	20.3	23.13	41.64
21.0	39.49	21.97	21.1	5.03	13.67	21.1	50.40	31.94	21.2	25.58	18.52	21.3	22.52	41.70
22.0	39.67	21.58	22.1	5.01	13.29	22.1	50.32	31.59	22.2	24.92	18.27	22.3	21.89	41.73
23.0	39.97	21.19	23.1	5.00	12.91	23.1	50.25	31.23	23.2	24.31	18.01	23.3	21.27	41.73
24.0	40.33	20.82	24.1	4.99	12.54	24.1	50.21	30.87	24.2	23.76	17.74	24.3	20.69	41.71
25.0	40.74	20.47	25.1	5.00	12.19	25.1	50.17	30.54	25.2	23.27	17.47	25.3	20.14	41.68
25.9	41.15	20.15	26.0	5.02	11.87	26.1	50.14	30.21	26.2	22.81	17.21	26.3	19.63	41.65
26.9	41.52	19.84	27.0	5.03	11.57	27.1	50.11	29.91	27.2	22.38	16.98	27.3	19.14	41.62
27.9	41.83	19.54	28.0	5.03	11.27	28.1	50.07	29.63	28.2	21.93	16.75	28.3	18.66	41.60
28.9	42.07	19.24	29.0	5.03	10.97	29.1	50.02	29.35	29.2	21.46	16.55	29.3	18.17	41.61
29.9	42.27	18.93	30.0	5.02	10.67	30.1	49.96	29.06	30.2	20.94	16.34	30.3	17.67	41.63
30.9	42.46	18.59	31.0	5.00	10.36	31.1	49.90	28.76	31.2	20.39	16.14	31.3	17.15	41.66
31.9	42.65	18.24	32.0	4.98	10.02	32.1	49.83	28.44	32.2	19.81	15.92	32.3	16.59	41.70
51.62	+51.61	6.93	+6.86	8.20	+8.14	31.35	+31.33	23.50	+23.48					
13 ^m	47°.916	9 ^h 25 ^m	4°.133	10 ^h 20 ^m	49°.679	12 ^h 14 ^m	27°.688	15 ^h 4 ^m	20°.10					
33'	22''.50	+81° 42'	12''.85	+82° 59'	30''.46	+88° 10'	15''.98	+87° 33'	38''.31					

[Eph 15]

APPARENT PLACES OF CIRCUMPOLAR STARS FOR THE UPPER TRANSIT AT WASHINGTON.

Groombridge 1119. Mag. 7.0			1 H. Draconis. Mag. 4.6			30 H. Camelop. Mag. 5.3			Bradley 1673. Mag. 6.3			Groombridge 221. Mag. 7.2		
Mean Solar Date.	Right Ascension.	Declination North.	Mean Solar Date.	Right Ascension.	Declination North.	Mean Solar Date.	Right Ascension.	Declination North.	Mean Solar Date.	Right Ascension.	Declination North.	Mean Solar Date.	Right Ascension.	Declination North.
Aug.	h m 8 13	° ' " +88 53	Aug.	h m 9 25	° ' " +81 41	Aug.	h m 10 20	° ' " +82 59	Aug.	h m 12 14	° ' " +88 10	Aug.	h m 15 3	° ' " +87 33
0.9	42.65	18.24	1.0	4.98	70.02	1.1	49.83	28.44	1.2	19.81	15.92	1.3	76.59	41.70
1.9	42.88	17.86	2.0	4.97	69.67	2.1	49.77	28.11	2.1	19.22	15.68	2.3	76.01	41.72
2.9	43.17	17.49	3.0	4.97	69.30	3.1	49.71	27.77	3.1	18.63	15.42	3.3	75.41	41.72
3.9	43.53	17.11	4.0	4.97	68.93	4.1	49.65	27.40	4.1	18.05	15.14	4.3	74.80	41.71
4.9	43.95	16.74	5.0	4.98	68.56	5.1	49.61	27.03	5.1	17.51	14.85	5.3	74.20	41.67
5.9	44.45	16.37	6.0	4.99	68.18	6.1	49.59	26.66	6.1	17.01	14.55	6.3	73.60	41.61
6.9	44.99	16.02	7.0	5.02	67.81	7.1	49.57	26.29	7.1	16.55	14.24	7.3	73.01	41.53
7.9	45.58	15.69	8.0	5.06	67.45	8.1	49.56	25.93	8.1	16.13	13.93	8.2	72.45	41.45
8.9	46.18	15.36	9.0	5.09	67.11	9.1	49.55	25.58	9.1	15.74	13.62	9.2	71.92	41.35
9.9	46.78	15.05	10.0	5.13	66.78	10.0	49.55	25.24	10.1	15.38	13.32	10.2	71.41	41.25
10.9	47.36	14.76	11.0	5.17	66.47	11.0	49.55	24.92	11.1	15.02	13.04	11.2	70.91	41.16
11.9	47.87	14.47	12.0	5.21	66.16	12.0	49.54	24.61	12.1	14.65	12.77	12.2	70.42	41.09
12.9	48.34	14.18	13.0	5.23	65.85	13.0	49.53	24.30	13.1	14.26	12.51	13.2	69.92	41.03
13.9	48.77	13.87	13.9	5.25	65.53	14.0	49.50	23.99	14.1	13.82	12.25	14.2	69.40	40.99
14.9	49.20	13.53	14.9	5.27	65.19	15.0	49.47	23.65	15.1	13.34	11.98	15.2	68.84	40.95
15.9	49.65	13.18	15.9	5.29	64.83	16.0	49.43	23.29	16.1	12.84	11.69	16.2	68.25	40.89
16.9	50.17	12.80	16.9	5.31	64.44	17.0	49.41	22.90	17.1	12.32	11.38	17.2	67.63	40.82
17.9	50.78	12.43	17.9	5.34	64.04	18.0	49.39	22.50	18.1	11.83	11.03	18.2	67.00	40.73
18.9	51.50	12.06	18.9	5.38	63.64	19.0	49.39	22.09	19.1	11.39	10.67	19.2	66.37	40.61
19.9	52.30	11.71	19.9	5.44	63.24	20.0	49.40	21.68	20.1	11.00	10.30	20.2	65.76	40.46
20.9	53.16	11.37	20.9	5.52	62.86	21.0	49.43	21.28	21.1	10.68	9.92	21.2	65.19	40.29
21.9	54.03	11.07	21.9	5.59	62.51	22.0	49.47	20.90	22.1	10.40	9.55	22.2	64.66	40.12
22.9	54.88	10.79	22.9	5.66	62.18	23.0	49.51	20.54	23.1	10.16	9.21	23.2	64.16	39.94
23.9	55.67	10.52	23.9	5.73	61.87	24.0	49.54	20.21	24.1	9.91	8.88	24.2	63.68	39.78
24.9	56.39	10.26	24.9	5.79	61.57	25.0	49.57	19.88	25.1	9.65	8.57	25.2	63.21	39.64
25.9	57.04	9.98	25.9	5.84	61.25	26.0	49.58	19.55	26.1	9.34	8.27	26.2	62.72	39.52
26.9	57.69	9.69	26.9	5.89	60.93	27.0	49.59	19.22	27.1	9.02	7.97	27.2	62.22	39.41
27.9	58.32	9.39	27.9	5.93	60.59	27.9	49.59	18.87	28.1	8.65	7.65	28.2	61.69	39.31
28.9	58.98	9.07	28.9	5.98	60.24	28.9	49.60	18.50	29.1	8.27	7.33	29.2	61.14	39.19
29.9	59.68	8.74	29.9	6.03	59.87	29.9	49.60	18.12	30.1	7.89	6.99	30.2	60.57	39.06
30.9	60.45	8.40	30.9	6.09	59.49	30.9	49.62	17.73	31.1	7.53	6.63	31.2	59.98	38.92
31.9	61.28	8.07	31.9	6.16	59.12	31.9	49.64	17.33	32.1	7.20	6.25	32.2	59.40	38.76
51.48	+51.47	6.93	+6.86	8.19	+8.13	31.31	+31.30	23.50	+23.48					
8 ^h 13 ^m	47 ^h .916	9 ^h 25 ^m	4 ^h .133	10 ^h 20 ^m	49 ^h .679	12 ^h 14 ^m	27 ^h .688	15 ^h 4 ^m	20 ^h .10					
+88° 53'	22'' .50	+81° 42'	12'' .85	+82° 59'	30'' .46	+88° 10'	15'' .98	+87° 33'	38'' .31					

APPARENT PLACES OF CIRCUMPOLAR STARS

FOR THE UPPER TRANSIT AT WASHINGTON.

ridge 1119. Mag. 7.0			1 H. Draconis. Mag. 4.6			30 H. Camelop. Mag. 5.3			Bradley 1672. Mag. 6.3			Groombridge 2283. Mag. 7.2		
Right Ascension.	Declination North.	Mean Solar Date.	Right Ascension.	Declination North.	Mean Solar Date.	Right Ascension.	Declination North.	Mean Solar Date.	Right Ascension.	Declination North.	Mean Solar Date.	Right Ascension.	Declination North.	Mean Solar Date.
h m s	° ' "	Sept.	h m s	° ' "	Sept.	h m s	° ' "	Sept.	h m s	° ' "	Sept.	h m s	° ' "	Sept.
8 14	+88 53		9 25	+81 41		10 20	+82 59		12 14	+88 9		15 3	+87 33	
1.28	8.07	0.9	6.16	59.12	0.9	49.64	17.33	1.1	7.20	66.25	1.2	59.40	38.76	
1.18	7.75	1.9	6.23	58.75	1.9	49.67	16.93	2.1	6.90	65.86	2.2	58.83	38.57	
1.13	7.44	2.9	6.32	58.38	2.9	49.72	16.53	3.1	6.64	65.47	3.2	58.27	38.36	
1.12	7.15	3.9	6.41	58.03	3.9	49.78	16.14	4.1	6.43	65.08	4.2	57.74	38.14	
1.13	6.88	4.9	6.51	57.69	4.9	49.85	15.77	5.1	6.26	64.69	5.2	57.24	37.91	
1.14	6.63	5.9	6.61	57.37	5.9	49.92	15.41	6.1	6.12	64.31	6.2	56.77	37.69	
1.13	6.39	6.9	6.71	57.06	6.9	49.99	15.06	7.0	5.99	63.95	7.2	56.32	37.46	
1.08	6.15	7.9	6.81	56.76	7.9	50.05	14.72	8.0	5.86	63.60	8.2	55.88	37.25	
98	5.92	8.9	6.90	56.47	8.9	50.12	14.39	9.0	5.71	63.26	9.2	55.43	37.05	
82	5.68	9.9	6.98	56.17	9.9	50.17	14.06	10.0	5.52	62.93	10.2	54.98	36.87	
64	5.41	10.9	7.05	55.85	10.9	50.21	13.72	11.0	5.30	62.59	11.2	54.50	36.69	
47	5.14	11.9	7.12	55.52	11.9	50.24	13.36	12.0	5.05	62.24	12.2	53.99	36.52	
34	4.84	12.9	7.20	55.16	12.9	50.28	12.97	13.0	4.78	61.86	13.2	53.44	36.34	
31	4.53	13.9	7.28	54.78	13.9	50.33	12.56	14.0	4.52	61.46	14.1	52.88	36.13	
35	4.22	14.9	7.38	54.40	14.9	50.39	12.14	15.0	4.30	61.05	15.1	52.32	35.89	
48	3.93	15.9	7.49	54.03	15.9	50.46	11.73	16.0	4.13	60.62	16.1	51.78	35.62	
69	3.66	16.9	7.61	53.68	16.9	50.56	11.32	17.0	4.03	60.18	17.1	51.27	35.33	
93	3.43	17.9	7.74	53.35	17.9	50.67	10.94	18.0	4.00	59.76	18.1	50.80	35.04	
15	3.22	18.9	7.88	53.05	18.9	50.78	10.59	19.0	3.99	59.36	19.1	50.38	34.74	
30	3.02	19.9	8.00	52.76	19.9	50.88	10.25	20.0	4.00	58.98	20.1	49.98	34.46	
40	2.84	20.9	8.12	52.49	20.9	50.98	9.93	21.0	4.01	58.61	21.1	49.60	34.19	
41	2.65	21.9	8.23	52.23	21.9	51.07	9.62	22.0	3.98	58.26	22.1	49.22	33.95	
40	2.46	22.9	8.33	51.95	22.9	51.15	9.29	23.0	3.91	57.91	23.1	48.82	33.72	
35	2.24	23.9	8.43	51.67	23.9	51.22	8.96	24.0	3.82	57.56	24.1	48.40	33.50	
32	2.01	24.9	8.53	51.37	24.9	51.30	8.62	24.9	3.70	57.20	25.1	47.95	33.27	
32	1.77	25.9	8.63	51.06	25.9	51.37	8.27	25.9	3.57	56.82	26.1	47.48	33.03	
38	1.53	26.9	8.74	50.73	26.9	51.45	7.90	26.9	3.47	56.43	27.1	47.01	32.77	
51	1.28	27.9	8.85	50.40	27.9	51.54	7.52	27.9	3.39	56.03	28.1	46.54	32.50	
59	1.05	28.9	8.97	50.08	28.9	51.65	7.14	28.9	3.33	55.61	29.1	46.08	32.22	
72	0.83	29.9	9.10	49.76	29.9	51.76	6.77	29.9	3.33	55.19	30.1	45.64	31.91	
19	0.63	30.9	9.25	49.45	30.9	51.88	6.41	30.9	3.37	54.77	31.1	45.22	31.59	
19	0.45	31.9	9.39	49.17	31.9	52.01	6.06	31.9	3.45	54.35	32.1	44.84	31.25	
+51.35	6.92	+6.85	8.19	+8.13	31.26	+31.25	23.49	+23.47						
47° 9' 16"	9 ^h 25 ^m	4°.133	10 ^h 20 ^m	49°.679	12 ^h 14 ^m	27°.688	15 ^h 4 ^m	20°.10						
22° 50'	+81° 42'	12° 85'	+82° 59'	30° 46'	+88° 10'	15° 98'	+87° 33'	38° 31'						

[Eph 13]

APPARENT PLACES OF CIRCUMPOLAR STARS

FOR THE UPPER TRANSIT AT WASHINGTON.

Groombridge 1119. Mag. 7.0			1 H. Draconis. Mag. 4.6			30 H. Camelop. Mag. 5.3			Bradley 1672. Mag. 6.3			Groombridge Mag. 7.1	
Mean Solar Date.	Right Ascension.	Declination North.	Mean Solar Date.	Right Ascension.	Declination North.	Mean Solar Date.	Right Ascension.	Declination North.	Mean Solar Date.	Right Ascension.	Declination North.	Mean Solar Date.	Right Ascension.
Oct.	h m	"	Oct.	h m	"	Oct.	h m	"	Oct.	h m	"	Oct.	h m
	8 14	+88 52		9 25	+81 41		10 20	+82 58		12 14	+88 9		15 3
	s			s			s			s			s
0.8	32.19	60.63	0.9	9.25	49.45	0.9	51.88	66.41	0.9	3.37	54.77	1.1	45.22
1.8	33.49	60.45	1.9	9.39	49.17	1.9	52.01	66.06	1.9	3.45	54.35	2.1	44.84
2.8	34.80	60.29	2.9	9.54	48.90	2.9	52.14	65.72	2.9	3.57	53.94	3.1	44.48
3.8	36.07	60.15	3.9	9.68	48.65	3.9	52.28	65.41	3.9	3.70	53.55	4.1	44.15
4.8	37.31	60.01	4.9	9.84	48.42	4.9	52.42	65.11	4.9	3.85	53.18	5.1	43.83
5.8	38.50	59.88	5.9	9.98	48.19	5.9	52.55	64.82	5.9	3.98	52.81	6.1	43.52
6.8	39.63	59.74	6.9	10.11	47.96	6.9	52.67	64.53	6.9	4.08	52.46	7.1	43.22
7.8	40.71	59.60	7.9	10.24	47.72	7.9	52.78	64.24	7.9	4.14	52.11	8.1	42.89
8.8	41.80	59.43	8.8	10.36	47.45	8.9	52.89	63.93	8.9	4.17	51.75	9.1	42.53
9.8	42.90	59.25	9.8	10.48	47.18	9.9	52.99	63.60	9.9	4.18	51.38	10.1	42.14
10.8	44.06	59.05	10.8	10.61	46.89	10.9	53.10	63.25	10.9	4.18	50.98	11.1	41.73
11.8	45.30	58.85	11.8	10.75	46.58	11.9	53.22	62.89	11.9	4.22	50.57	12.1	41.31
12.8	46.64	58.66	12.8	10.91	46.28	12.9	53.35	62.52	12.9	4.31	50.14	13.1	40.91
13.8	48.05	58.49	13.8	11.07	46.00	13.9	53.51	62.17	13.9	4.45	49.70	14.1	40.54
14.8	49.50	58.35	14.8	11.25	45.74	14.9	53.67	61.83	14.9	4.66	49.27	15.1	40.21
15.8	50.92	58.24	15.8	11.42	45.50	15.9	53.84	61.52	15.9	4.91	48.86	16.1	39.93
16.8	52.31	58.16	16.8	11.59	45.30	16.9	54.01	61.24	16.9	5.20	48.47	17.1	39.69
17.8	53.65	58.09	17.8	11.75	45.12	17.9	54.18	60.97	17.9	5.50	48.11	18.1	39.47
18.8	54.89	58.03	18.8	11.91	44.94	18.9	54.33	60.72	18.9	5.77	47.77	19.1	39.26
19.8	56.07	57.95	19.8	12.06	44.76	19.9	54.48	60.48	19.9	6.00	47.43	20.0	39.04
20.8	57.20	57.87	20.8	12.20	44.57	20.9	54.61	60.23	20.9	6.20	47.10	21.0	38.81
21.8	58.33	57.76	21.8	12.34	44.37	21.9	54.74	59.96	21.9	6.36	46.77	22.0	38.55
22.8	59.48	57.65	22.8	12.48	44.15	22.8	54.88	59.68	22.9	6.52	46.42	23.0	38.28
23.8	60.67	57.53	23.8	12.62	43.92	23.8	55.02	59.39	23.9	6.68	46.05	24.0	37.96
24.8	61.92	57.41	24.8	12.77	43.69	24.8	55.16	59.09	24.9	6.85	45.67	25.0	37.70
25.8	63.22	57.30	25.8	12.93	43.47	25.8	55.31	58.79	25.9	7.07	45.28	26.0	37.41
26.7	64.58	57.20	26.8	13.10	43.25	26.8	55.47	58.50	26.9	7.32	44.89	27.0	37.13
27.7	65.96	57.13	27.8	13.27	43.04	27.8	55.65	58.21	27.9	7.63	44.50	28.0	36.92
28.7	67.37	57.07	28.8	13.45	42.85	28.8	55.84	57.95	28.9	7.97	44.12	29.0	36.71
29.7	68.78	57.03	29.8	13.64	42.69	29.8	56.03	57.70	29.9	8.35	43.75	30.0	36.54
30.7	70.18	57.01	30.8	13.82	42.54	30.8	56.22	57.46	30.9	8.75	43.39	31.0	36.39
31.7	71.54	57.01	31.8	14.00	42.41	31.8	56.41	57.25	31.9	9.17	43.05	32.0	36.27
51.29	+51.28		6.92	+6.85		8.19	+8.13		31.20	+31.19		23.46	
8 ^h 13 ^m	47°.916		9 ^h 25 ^m	4°.133		10 ^h 20 ^m	49°.679		12 ^h 14 ^m	27°.688		15 ^h 4 ^m	
+88° 53'	22''.50		+81° 42'	12''.85		+82° 59'	30''.46		+88° 10'	15''.98		+87° 33'	

APPARENT PLACES OF CIRCUMPOLAR STARS

FOR THE UPPER TRANSIT AT WASHINGTON.

Greenbridge 1119. Mag. 7.0			1 H. Draconis. Mag. 4.6			30 H. Camelop. Mag. 5.3			Bradley 1672. Mag. 6.3			Groombridge 2283. Mag. 7.2		
Mean Solar Date.	Right Ascension.	Declination North.	Mean Solar Date.	Right Ascension.	Declination North.	Mean Solar Date.	Right Ascension.	Declination North.	Mean Solar Date.	Right Ascension.	Declination North.	Mean Solar Date.	Right Ascension.	Declination North.
Nov. 8 15	h m 8 15	+88 52	Nov. 9 25	h m 9 25	+81 41	Nov. 10 20	h m 10 20	+82 58	Nov. 12 14	h m 12 14	+88 9	Nov. 15 3	h m 15 3	+87 33
	s	"		s	"		s	"		s	"		s	"
0.7	11.54	57.01	0.8	14.00	42.41	0.8	56.41	57.25	0.9	9.17	43.05	1.0	36.27	21.08
1.7	12.83	57.01	1.8	14.18	42.29	1.8	56.59	57.05	1.9	9.58	42.73	2.0	36.17	20.72
2.7	14.06	57.02	2.8	14.35	42.17	2.8	56.76	56.86	2.9	9.96	42.42	3.0	36.07	20.37
3.7	15.25	57.01	3.8	14.50	42.05	3.8	56.93	56.67	3.9	10.32	42.12	4.0	35.95	20.04
4.7	16.39	56.99	4.8	14.65	41.92	4.8	57.09	56.46	4.9	10.64	41.82	5.0	35.82	19.71
5.7	17.55	56.95	5.8	14.81	41.76	5.8	57.24	56.24	5.9	10.92	41.50	6.0	35.65	19.38
6.7	18.74	56.90	6.8	14.97	41.59	6.8	57.40	56.00	6.9	11.20	41.17	7.0	35.45	19.04
7.7	20.01	56.84	7.8	15.13	41.41	7.8	57.56	55.74	7.9	11.50	40.82	7.9	35.25	18.69
8.7	21.35	56.78	8.8	15.30	41.24	8.8	57.74	55.49	8.9	11.83	40.45	8.9	35.06	18.31
9.7	22.76	56.75	9.8	15.49	41.07	9.8	57.93	55.24	9.9	12.21	40.07	9.9	34.90	17.91
10.7	24.22	56.74	10.8	15.69	40.92	10.8	58.14	55.00	10.9	12.67	39.70	10.9	34.77	17.48
11.7	25.69	56.77	11.8	15.89	40.80	11.8	58.35	54.79	11.9	13.18	39.35	11.9	34.70	17.05
12.7	27.13	56.82	12.8	16.09	40.71	12.8	58.57	54.61	12.9	13.72	39.02	12.9	34.67	16.63
13.7	28.47	56.88	13.7	16.28	40.65	13.8	58.78	54.45	13.9	14.27	38.72	13.9	34.66	16.23
14.7	29.73	56.97	14.7	16.46	40.61	14.8	58.98	54.32	14.9	14.81	38.45	14.9	34.68	15.86
15.7	30.91	57.04	15.7	16.63	40.56	15.8	59.17	54.19	15.9	15.31	38.19	15.9	34.70	15.51
16.7	32.04	57.11	16.7	16.79	40.51	16.8	59.35	54.07	16.9	15.79	37.93	16.9	34.70	15.18
17.7	33.13	57.16	17.7	16.95	40.45	17.8	59.52	53.94	17.9	16.22	37.68	17.9	34.68	14.85
18.7	34.24	57.19	18.7	17.11	40.38	18.8	59.69	53.79	18.9	16.63	37.42	18.9	34.64	14.53
19.7	35.36	57.22	19.7	17.27	40.29	19.8	59.86	53.63	19.8	17.04	37.15	19.9	34.59	14.20
20.7	36.53	57.25	20.7	17.44	40.20	20.8	60.04	53.46	20.8	17.46	36.87	20.9	34.54	13.85
21.7	37.75	57.28	21.7	17.61	40.11	21.8	60.23	53.29	21.8	17.91	36.57	21.9	34.50	13.48
22.7	39.01	57.32	22.7	17.78	40.03	22.8	60.42	53.13	22.8	18.39	36.27	22.9	34.46	13.10
23.7	40.31	57.38	23.7	17.97	39.95	23.8	60.63	52.98	23.8	18.92	35.99	23.9	34.45	12.71
24.7	41.61	57.47	24.7	18.15	39.90	24.8	60.84	52.84	24.8	19.49	35.70	24.9	34.48	12.32
25.7	42.92	57.57	25.7	18.35	39.87	25.8	61.06	52.72	25.8	20.09	35.42	25.9	34.54	11.93
26.7	44.22	57.70	26.7	18.55	39.86	26.8	61.28	52.61	26.8	20.72	35.16	26.9	34.63	11.53
27.7	45.46	57.84	27.7	18.73	39.87	27.7	61.50	52.53	27.8	21.37	34.91	27.9	34.74	11.15
28.7	46.65	57.98	28.7	18.92	39.90	28.7	61.72	52.47	28.8	22.01	34.69	28.9	34.88	10.78
29.7	47.77	58.13	29.7	19.09	39.93	29.7	61.92	52.42	29.8	22.64	34.49	29.9	35.03	10.43
30.7	48.81	58.28	30.7	19.26	39.96	30.7	62.11	52.37	30.8	23.23	34.30	30.9	35.17	10.10
31.6	49.82	58.41	31.7	19.42	39.98	31.7	62.30	52.32	31.8	23.78	34.12	31.9	35.28	9.79
51.28	+51.27		6.92	+6.85		8.18	+8.12		31.15	+31.14		23.43	+23.41	
8 ^h 13 ^m	47 ^s .916		9 ^h 25 ^m	4 ^s .133		10 ^h 20 ^m	49 ^s .679		12 ^h 14 ^m	27 ^s .688		15 ^h 4 ^m	20 ^s .10	
+88° 53'	22".50		+81° 42'	12".85		+82° 59'	30".46		+88° 10'	15".98		+87° 33'	38".31	
33281°—1915—18						[Eph 15]								

APPARENT PLACES OF CIRCUMPOLAR STARS

FOR THE UPPER TRANSIT AT WASHINGTON.

Groombridge 1119. Mag. 7.0			1 H. Draconis. Mag. 4.6			30 H. Camelop. Mag. 5.3			Bradley 1872. Mag. 6.3			Groombridge 2 Mag. 7.2		
Mean Solar Date.	Right Ascension.	Declination North.	Mean Solar Date.	Right Ascension.	Declination North.	Mean Solar Date.	Right Ascension.	Declination North.	Mean Solar Date.	Right Ascension.	Declination North.	Mean Solar Date.	Right Ascension.	Declination North.
Dec.	h m 8 15 s	° ' +88 52 "	Dec.	h m 9 25 s	° ' +81 41 "	Dec.	h m 10 21 s	° ' +82 58 "	Dec.	h m 12 14 s	° ' +88 9 "	Dec.	h m 15 3 s	° ' +8 "
0.7	48.81	58.28	0.7	19.26	39.96	0.7	2.11	52.37	0.8	23.23	34.30	0.9	35.17	1
1.6	49.82	58.41	1.7	19.42	39.98	1.7	2.30	52.32	1.8	23.78	34.12	1.9	35.28	
2.6	50.81	58.53	2.7	19.57	39.99	2.7	2.47	52.25	2.8	24.29	33.93	2.9	35.37	
3.6	51.81	58.64	3.7	19.72	39.98	3.7	2.65	52.17	3.8	24.78	33.72	3.9	35.44	
4.6	52.86	58.73	4.7	19.88	39.96	4.7	2.83	52.08	4.8	25.28	33.49	4.9	35.49	
5.6	53.98	58.82	5.7	20.04	39.92	5.7	3.02	51.97	5.8	25.80	33.25	5.9	35.54	
6.6	55.18	58.92	6.7	20.22	39.90	6.7	3.24	51.86	6.8	26.37	33.00	6.9	35.61	
7.6	56.43	59.04	7.7	20.41	39.89	7.7	3.45	51.77	7.8	27.00	32.76	7.9	35.71	
8.6	57.68	59.20	8.7	20.60	39.91	8.7	3.68	51.70	8.8	27.69	32.52	8.9	35.86	
9.6	58.90	59.38	9.7	20.80	39.97	9.7	3.91	51.67	9.8	28.42	32.31	9.9	36.06	
10.6	60.06	59.59	10.7	20.99	40.05	10.7	4.13	51.66	10.8	29.15	32.13	10.9	36.30	
11.6	61.12	59.81	11.7	21.17	40.15	11.7	4.35	51.67	11.8	29.88	31.98	11.9	36.56	
12.6	62.08	60.03	12.7	21.34	40.25	12.7	4.56	51.70	12.8	30.58	31.85	12.9	36.82	
13.6	62.96	60.24	13.7	21.49	40.36	13.7	4.75	51.74	13.8	31.25	31.74	13.9	37.08	
14.6	63.80	60.44	14.7	21.63	40.46	14.7	4.93	51.77	14.8	31.86	31.63	14.9	37.31	
15.6	64.61	60.62	15.7	21.77	40.55	15.7	5.10	51.78	15.8	32.45	31.51	15.9	37.53	
16.6	65.44	60.79	16.7	21.91	40.63	16.7	5.27	51.79	16.8	33.02	31.39	16.9	37.73	
17.6	66.29	60.96	17.7	22.05	40.69	17.7	5.45	51.79	17.8	33.60	31.26	17.9	37.92	
18.6	67.18	61.13	18.7	22.20	40.76	18.7	5.63	51.78	18.8	34.19	31.12	18.9	38.12	
19.6	68.12	61.31	19.7	22.36	40.82	19.7	5.81	51.78	19.8	34.82	30.97	19.9	38.33	
20.6	69.07	61.51	20.6	22.52	40.90	20.7	6.01	51.79	20.8	35.47	30.83	20.9	38.55	
21.6	70.05	61.72	21.6	22.68	41.00	21.7	6.21	51.81	21.8	36.17	30.69	21.9	38.80	
22.6	71.02	61.95	22.6	22.84	41.12	22.7	6.41	51.85	22.8	36.90	30.56	22.9	39.09	
23.6	71.97	62.20	23.6	23.01	41.26	23.7	6.62	51.90	23.8	37.66	30.45	23.9	39.41	
24.6	72.87	62.46	24.6	23.17	41.42	24.7	6.83	51.98	24.8	38.42	30.36	24.9	39.76	
25.6	73.71	62.74	25.6	23.33	41.58	25.7	7.04	52.07	25.8	39.19	30.29	25.9	40.12	
26.6	74.48	63.02	26.6	23.49	41.76	26.7	7.24	52.18	26.7	39.93	30.24	26.9	40.49	
27.6	75.17	63.31	27.6	23.62	41.96	27.7	7.42	52.29	27.7	40.65	30.21	27.9	40.88	
28.6	75.80	63.58	28.6	23.74	42.14	28.7	7.59	52.41	28.7	41.33	30.20	28.9	41.24	
29.6	76.38	63.83	29.6	23.87	42.30	29.7	7.75	52.52	29.7	41.96	30.17	29.9	41.57	
30.6	76.96	64.05	30.6	23.98	42.45	30.7	7.90	52.61	30.7	42.56	30.14	30.9	41.88	
31.6	77.58	64.27	31.6	24.10	42.59	31.7	8.06	52.69	31.7	43.14	30.10	31.9	42.16	
51.32	+51.31	6.92	+6.85	8.18	+8.12	31.12	+31.11	23.41	+23.41	23.41	+23.41	23.41	+23.41	+23.41
8 ^h 13 ^m	47 ^s .916	9 ^h 25 ^m	4 ^s .133	10 ^h 20 ^m	49 ^s .679	12 ^h 14 ^m	27 ^s .688	15 ^h 4 ^m	20	15 ^h 4 ^m	20	15 ^h 4 ^m	20	15 ^h 4 ^m
+88° 53'	22'' .50	+81° 42'	12'' .85	+82° 59'	30'' .46	+88° 10'	15'' .98	+87° 33'	38'	+87° 33'	38'	+87° 33'	38'	+87° 33'

[Eph 15]

APPARENT PLACES OF CIRCUMPOLAR STARS

FOR THE UPPER TRANSIT AT WASHINGTON.

α Minoris. Mag. 4.4			δ Ursæ Minoris. Mag. 4.4			λ Ursæ Minoris. Mag. 6.6			76 Draconis. Mag. 5.7			39 H. Cephei. Mag. 5.6		
Right Ascension.	Declination North.	Mean Solar Date.	Right Ascension.	Declination North.	Mean Solar Date.	Right Ascension.	Declination North.	Mean Solar Date.	Right Ascension.	Declination North.	Mean Solar Date.	Right Ascension.	Declination North.	Mean Solar Date.
h m	° '		h m	° '		h m	° '		h m	° '		h m	° '	
16 54	+82 10	Jan.	17 59	+86 36	Jan.	19 3	+89 0	Jan.	20 48	+82 13	Jan.	23 27	+86 50	Jan.
s	"		s	"		s	"		s	"		s	"	
28.83	27.10	0.9	14.03	40.49	1.0	23.85	47.52	1.1	37.22	10.73	1.2	28.42	41.13	1.3
28.87	26.73	1.9	13.99	40.12	2.0	23.33	47.18	2.1	37.10	10.46	2.2	27.98	41.11	2.3
28.93	26.35	2.9	13.99	39.73	3.0	22.88	46.83	3.1	36.98	10.18	3.2	27.54	41.07	3.3
29.00	25.98	3.9	14.01	39.34	4.0	22.51	46.46	4.1	36.87	9.88	4.2	27.10	41.00	4.3
29.07	25.61	4.9	14.06	38.97	5.0	22.25	46.10	5.1	36.77	9.57	5.2	26.68	40.91	5.3
29.15	25.27	5.9	14.13	38.61	6.0	22.08	45.74	6.1	36.68	9.25	6.2	26.28	40.79	6.3
29.24	24.95	6.9	14.22	38.27	6.9	22.00	45.40	7.1	36.61	8.95	7.2	25.91	40.67	7.3
29.33	24.65	7.9	14.31	37.96	7.9	21.94	45.09	8.1	36.55	8.66	8.2	25.57	40.55	8.3
29.41	24.38	8.9	14.39	37.67	8.9	21.89	44.80	9.1	36.49	8.40	9.2	25.26	40.45	9.3
29.48	24.12	9.9	14.45	37.39	9.9	21.79	44.52	10.1	36.43	8.15	10.2	24.96	40.36	10.3
29.55	23.86	10.9	14.50	37.11	10.9	21.63	44.25	11.1	36.36	7.91	11.2	24.66	40.28	11.3
29.60	23.58	11.9	14.53	36.82	11.9	21.40	43.98	12.1	36.29	7.68	12.2	24.33	40.22	12.3
29.66	23.28	12.9	14.55	36.51	12.9	21.11	43.68	13.1	36.20	7.44	13.2	23.97	40.16	13.3
29.72	22.95	13.9	14.58	36.18	13.9	20.83	43.36	14.1	36.11	7.16	14.2	23.59	40.09	14.3
29.80	22.61	14.9	14.64	35.82	14.9	20.61	43.01	15.1	36.02	6.86	15.2	23.19	39.99	15.3
29.88	22.27	15.9	14.72	35.45	15.9	20.46	42.64	16.0	35.93	6.54	16.2	22.78	39.87	16.3
29.99	21.94	16.9	14.83	35.09	16.9	20.42	42.27	17.0	35.86	6.20	17.2	22.37	39.72	17.3
30.11	21.62	17.9	14.97	34.74	17.9	20.49	41.90	18.0	35.80	5.85	18.2	21.99	39.55	18.3
30.23	21.32	18.9	15.13	34.40	18.9	20.67	41.54	19.0	35.75	5.50	19.1	21.63	39.36	19.3
30.35	21.05	19.9	15.31	34.09	19.9	20.90	41.20	20.0	35.71	5.16	20.1	21.31	39.16	20.3
30.47	20.80	20.9	15.50	33.79	20.9	21.18	40.89	21.0	35.68	4.83	21.1	21.01	38.96	21.3
30.59	20.57	21.9	15.68	33.51	21.9	21.46	40.59	22.0	35.67	4.52	22.1	20.72	38.76	22.3
30.70	20.34	22.9	15.85	33.25	22.9	21.74	40.30	23.0	35.65	4.23	23.1	20.45	38.58	23.3
30.81	20.12	23.9	16.01	33.00	23.9	21.99	40.02	24.0	35.62	3.94	24.1	20.19	38.41	24.3
30.91	19.91	24.9	16.17	32.74	24.9	22.21	39.74	25.0	35.59	3.65	25.1	19.93	38.24	25.3
31.02	19.68	25.9	16.31	32.48	25.9	22.37	39.46	26.0	35.56	3.37	26.1	19.65	38.08	26.3
31.12	19.44	26.9	16.45	32.20	26.9	22.51	39.16	27.0	35.52	3.08	27.1	19.35	37.93	27.3
31.22	19.19	27.9	16.60	31.91	27.9	22.68	38.85	28.0	35.49	2.78	28.1	19.03	37.76	28.3
31.33	18.92	28.9	16.76	31.60	28.9	22.85	38.53	29.0	35.45	2.46	29.1	18.70	37.59	29.3
31.45	18.65	29.9	16.93	31.28	29.9	23.05	38.19	30.0	35.41	2.11	30.1	18.36	37.39	30.3
31.58	18.38	30.9	17.12	30.96	30.9	23.34	37.84	31.0	35.37	1.75	31.1	18.02	37.17	31.3
31.72	18.12	31.9	17.35	30.65	31.9	23.72	37.48	32.0	35.35	1.39	32.1	17.69	36.93	32.3
+7.27	16.91	+16.88	57.98	+57.98	7.38	+7.32	18.17	+18.14						
37°.997	17 ^h 59 ^m	40°.30	19 ^h 5 ^m	3°.27	20 ^h 48 ^m	48°.820	23 ^h 27 ^m	44°.653						
44''.05	+86° 36'	51''.19	+89° 0'	51''.13	+82° 13'	2''.89	+86° 50'	19''.16						

[Eph 15]

APPARENT PLACES OF CIRCUMPOLAR STARS

FOR THE UPPER TRANSIT AT WASHINGTON.

ε Ursæ Minoris. Mag. 4.4			δ Ursæ Minoris. Mag. 4.4			λ Ursæ Minoris. Mag. 6.6			76 Draconis. Mag. 5.7			89 H. Ceph Mag. 5.6	
Mean Solar Date.	Right Ascension.	Declination North.	Mean Solar Date.	Right Ascension.	Declination North.	Mean Solar Date.	Right Ascension.	Declination North.	Mean Solar Date.	Right Ascension.	Declination North.	Mean Solar Date.	Right Ascension.
Feb.	h m 16 54	° ' +82 10	Feb.	h m 17 59	° ' +86 36	Feb.	h m 19 3	° ' +89 0	Feb.	h m 20 48	° ' +82 12	Feb.	h m 23 27
	s "	"		s "	"		s "	"		s "	"		s "
0.8	31.72	18.12	0.9	17.35	30.65	0.9	23.72	37.48	1.0	35.35	61.39	1.1	17.69
1.8	31.87	17.89	1.9	17.59	30.35	1.9	24.21	37.14	2.0	35.34	61.02	2.1	17.39
2.8	32.02	17.68	2.9	17.86	30.08	2.9	24.78	36.82	2.9	35.34	60.66	3.1	17.12
3.8	32.17	17.49	3.9	18.13	29.83	3.9	25.40	36.52	3.9	35.36	60.31	4.1	16.89
4.8	32.32	17.33	4.9	18.40	29.61	4.9	26.03	36.25	4.9	35.39	59.99	5.1	16.69
5.8	32.46	17.20	5.9	18.66	29.41	5.9	26.64	36.00	5.9	35.41	59.68	6.1	16.50
6.8	32.59	17.07	6.9	18.89	29.22	6.9	27.19	35.77	6.9	35.43	59.40	7.1	16.32
7.8	32.71	16.92	7.9	19.10	29.03	7.9	27.65	35.54	7.9	35.44	59.13	8.1	16.12
8.8	32.83	16.76	8.9	19.29	28.81	8.9	28.06	35.29	8.9	35.44	58.86	9.1	15.91
9.8	32.95	16.58	9.9	19.49	28.58	9.9	28.45	35.02	9.9	35.43	58.57	10.1	15.67
10.8	33.07	16.38	10.9	19.70	28.33	10.9	28.86	34.73	10.9	35.43	58.25	11.1	15.41
11.8	33.21	16.17	11.9	19.94	28.07	11.9	29.35	34.43	11.9	35.42	57.91	12.1	15.14
12.8	33.37	15.98	12.9	20.20	27.80	12.9	29.93	34.11	12.9	35.43	57.55	13.1	14.88
13.8	33.53	15.80	13.9	20.49	27.54	13.9	30.61	33.80	13.9	35.45	57.19	14.1	14.64
14.8	33.70	15.64	14.9	20.81	27.30	14.9	31.39	33.50	14.9	35.48	56.83	15.1	14.42
15.8	33.87	15.51	15.8	21.15	27.09	15.9	32.23	33.22	15.9	35.53	56.47	16.1	14.23
16.8	34.04	15.41	16.8	21.49	26.91	16.9	33.13	32.97	16.9	35.59	56.13	17.1	14.08
17.8	34.20	15.32	17.8	21.82	26.75	17.9	34.04	32.73	17.9	35.65	55.82	18.1	13.95
18.8	34.36	15.25	18.8	22.15	26.60	18.9	34.94	32.51	18.9	35.71	55.52	19.1	13.84
19.8	34.52	15.19	19.8	22.46	26.46	19.9	35.81	32.31	19.9	35.77	55.23	20.1	13.73
20.8	34.66	15.13	20.8	22.77	26.33	20.9	36.65	32.11	20.9	35.83	54.95	21.1	13.63
21.8	34.80	15.07	21.8	23.06	26.19	21.9	37.45	31.91	21.9	35.88	54.69	22.1	13.52
22.8	34.95	14.99	22.8	23.34	26.05	22.9	38.21	31.71	22.9	35.93	54.42	23.1	13.35
23.8	35.09	14.90	23.8	23.62	25.89	23.9	38.94	31.50	23.9	35.98	54.14	24.1	13.26
24.8	35.24	14.81	24.8	23.90	25.73	24.9	39.67	31.27	24.9	36.02	53.84	25.0	13.11
25.8	35.39	14.70	25.8	24.19	25.55	25.9	40.45	31.04	25.9	36.06	53.54	26.0	12.96
26.8	35.55	14.60	26.8	24.50	25.37	26.9	41.26	30.79	26.9	36.11	53.22	27.0	12.80
27.8	35.72	14.50	27.8	24.84	25.20	27.9	42.14	30.53	27.9	36.16	52.89	28.0	12.65
28.8	35.89	14.43	28.8	25.19	25.03	28.9	43.13	30.29	28.9	36.23	52.56	29.0	12.52
29.8	36.07	14.38	29.8	25.56	24.88	29.9	44.19	30.07	29.9	36.31	52.23	30.0	12.42
30.8	36.25	14.36	30.8	25.95	24.76	30.9	45.32	29.87	30.9	36.40	51.92	31.0	12.36
31.8	36.42	14.36	31.8	26.33	24.68	31.8	46.48	29.70	31.9	36.50	51.64	32.0	12.34
7.34	+7.27		16.90	+16.87		57.83	+57.82		7.38	+7.31		18.16	
16 ^h 54 ^m	37°.997		17 ^h 59 ^m	40°.30		19 ^h 5 ^m	3°.27		20 ^h 48 ^m	48°.820		23 ^h 27 ^m	
+82° 10'	44''.05		+86° 36'	51''.19		+89° 0'	51''.13		+82° 13'	2''.89		+86° 50'	

[Eph 15]

**APPARENT PLACES OF CIRCUMPOLAR STARS
FOR THE UPPER TRANSIT AT WASHINGTON.**

ε Ursæ Minoris. Mag. 4.4			δ Ursæ Minoris. Mag. 4.4			λ Ursæ Minoris. Mag. 6.6			76 Draconis. Mag. 5.7			39 H. Cephei. Mag. 5.6		
Mean Solar Date.	Right Ascension.	Declination North.	Mean Solar Date.	Right Ascension.	Declination North.	Mean Solar Date.	Right Ascension.	Declination North.	Mean Solar Date.	Right Ascension.	Declination North.	Mean Solar Date.	Right Ascension.	Declination North.
Mar. 16 54 s	h m 16 54	" +82 10	Mar. 17 59 s	h m 17 59	" +86 36	Mar. 19 3 s	h m 19 3	" +89 0	Mar. 20 48 s	h m 20 48	" +82 12	Mar. 23 27 s	h m 23 27	" +86 50
0.8	35.89	14.43	0.8	25.19	25.03	0.9	43.13	30.29	0.9	36.23	52.56	1.0	12.52	29.35
1.8	36.07	14.38	1.8	25.56	24.88	1.9	44.19	30.07	1.9	36.31	52.23	2.0	12.42	29.00
2.8	36.25	14.36	2.8	25.95	24.76	2.9	45.32	29.87	2.9	36.40	51.92	3.0	12.36	28.66
3.8	36.42	14.36	3.8	26.33	24.68	3.8	46.48	29.70	3.9	36.50	51.64	4.0	12.34	28.32
4.8	36.59	14.39	4.8	26.69	24.62	4.8	47.60	29.56	4.9	36.61	51.38	5.0	12.34	28.00
5.8	36.74	14.43	5.8	27.03	24.58	5.8	48.66	29.44	5.9	36.71	51.15	6.0	12.35	27.70
6.8	36.88	14.47	6.8	27.35	24.54	6.8	49.65	29.33	6.9	36.81	50.94	7.0	12.35	27.43
7.7	37.02	14.49	7.8	27.65	24.50	7.8	50.57	29.21	7.9	36.89	50.73	8.0	12.34	27.17
8.7	37.16	14.50	8.8	27.95	24.43	8.8	51.44	29.07	8.9	36.97	50.50	9.0	12.31	26.91
9.7	37.29	14.49	9.8	28.24	24.34	9.8	52.31	28.92	9.9	37.04	50.26	10.0	12.25	26.64
10.7	37.44	14.46	10.8	28.55	24.24	10.8	53.21	28.75	10.9	37.12	50.01	11.0	12.18	26.36
11.7	37.60	14.44	11.8	28.88	24.13	11.8	54.18	28.56	11.9	37.20	49.73	12.0	12.11	26.04
12.7	37.77	14.44	12.8	29.25	24.04	12.8	55.27	28.38	12.9	37.29	49.44	13.0	12.06	25.71
13.7	37.95	14.45	13.8	29.63	23.96	13.8	56.43	28.21	13.9	37.38	49.16	14.0	12.03	25.37
14.7	38.13	14.48	14.8	30.03	23.90	14.8	57.66	28.06	14.9	37.50	48.89	14.9	12.04	25.01
15.7	38.30	14.55	15.8	30.44	23.87	15.8	58.95	27.93	15.9	37.63	48.63	15.9	12.08	24.65
16.7	38.47	14.64	16.8	30.84	23.86	16.8	60.24	27.83	16.9	37.76	48.39	16.9	12.14	24.30
17.7	38.64	14.75	17.8	31.23	23.88	17.8	61.53	27.75	17.9	37.89	48.17	17.9	12.23	23.97
18.7	38.80	14.86	18.8	31.60	23.91	18.8	62.78	27.68	18.9	38.03	47.97	18.9	12.32	23.66
19.7	38.94	14.98	19.8	31.96	23.94	19.8	63.98	27.62	19.9	38.16	47.79	19.9	12.43	23.36
20.7	39.08	15.10	20.8	32.30	23.97	20.8	65.12	27.58	20.9	38.29	47.62	20.9	12.53	23.07
21.7	39.22	15.20	21.8	32.63	24.00	21.8	66.21	27.53	21.9	38.41	47.45	21.9	12.62	22.78
22.7	39.35	15.30	22.8	32.96	24.02	22.8	67.28	27.48	22.9	38.52	47.29	22.9	12.69	22.50
23.7	39.49	15.39	23.7	33.28	24.04	23.8	68.33	27.41	23.9	38.63	47.11	23.9	12.75	22.24
24.7	39.63	15.46	24.7	33.60	24.04	24.8	69.38	27.33	24.9	38.74	46.92	24.9	12.80	21.96
25.7	39.78	15.53	25.7	33.93	24.03	25.8	70.45	27.24	25.9	38.85	46.72	25.9	12.85	21.67
26.7	39.93	15.61	26.7	34.28	24.02	26.8	71.57	27.15	26.9	38.97	46.52	26.9	12.90	21.36
27.7	40.09	15.71	27.7	34.65	24.03	27.8	72.77	27.06	27.9	39.09	46.30	27.9	12.97	21.04
28.7	40.25	15.82	28.7	35.04	24.05	28.8	74.04	26.99	28.9	39.23	46.10	28.9	13.07	20.71
29.7	40.41	15.96	29.7	35.43	24.10	29.8	75.38	26.94	29.9	39.39	45.91	29.9	13.19	20.38
30.7	40.57	16.13	30.7	35.83	24.17	30.8	76.73	26.92	30.8	39.54	45.75	30.9	13.36	20.06
31.7	40.71	16.32	31.7	36.21	24.28	31.8	78.07	26.93	31.8	39.71	45.61	31.9	13.56	19.75
7-34	+7.27	16.89	+16.86	57.75	+57.74	7.38	+7.31	18.14	+18.12					
16 ^h 54 ^m	37°.997	17 ^h 59 ^m	40°.30	19 ^h 5 ^m	3°.27	20 ^h 48 ^m	48°.820	23 ^h 27 ^m	44°.653					
+82° 10'	44'".05	+86° 36'	51'".19	+89° 0'	51'".13	+82° 13'	2'".89	+86° 50'	19'".16					

APPARENT PLACES OF CIRCUMPOLAR STARS

FOR THE UPPER TRANSIT AT WASHINGTON.

ε Ursæ Minoris. Mag. 4.4			δ Ursæ Minoris. Mag. 4.4			λ Ursæ Minoris. Mag. 6.6			76 Draconis. Mag. 5.7			39 H. C. Mag.	
Mean Solar Date.	Right Ascension.	Declination North.	Mean Solar Date.	Right Ascension.	Declination North.	Mean Solar Date.	Right Ascension.	Declination North.	Mean Solar Date.	Right Ascension.	Declination North.	Mean Solar Date.	Right Ascension.
Apr. 16 54	h m	° '	Apr. 17 59	h m	° '	Apr. 19 4	h m	° '	Apr. 20 48	h m	° '	Apr. 23 27	h m
	s	"		s	"		s	"		s	"		s
0.7	40.71	16.32	0.7	36.21	24.28	0.8	18.07	26.93	0.8	39.71	45.61	0.9	13.56
1.7	40.85	16.53	1.7	36.56	24.41	1.8	19.36	26.97	1.8	39.87	45.50	1.9	13.77
2.7	40.98	16.74	2.7	36.88	24.54	2.8	20.55	27.01	2.8	40.02	45.41	2.9	13.98
3.7	41.09	16.94	3.7	37.18	24.67	3.8	21.64	27.06	3.8	40.15	45.34	3.9	14.18
4.7	41.19	17.12	4.7	37.47	24.78	4.8	22.68	27.10	4.8	40.29	45.26	4.9	14.36
5.7	41.30	17.28	5.7	37.75	24.88	5.8	23.67	27.12	5.8	40.42	45.17	5.9	14.51
6.7	41.40	17.43	6.7	38.04	24.96	6.8	24.69	27.12	6.8	40.55	45.06	6.9	14.64
7.7	41.52	17.57	7.7	38.35	25.02	7.8	25.77	27.11	7.8	40.67	44.93	7.9	14.77
8.7	41.65	17.71	8.7	38.69	25.09	8.8	26.90	27.09	8.8	40.81	44.79	8.9	14.91
9.7	41.80	17.87	9.7	39.04	25.17	9.7	28.13	27.08	9.8	40.95	44.65	9.9	15.07
10.7	41.95	18.06	10.7	39.40	25.27	10.7	29.41	27.09	10.8	41.11	44.52	10.9	15.25
11.7	42.09	18.28	11.7	39.77	25.40	11.7	30.75	27.12	11.8	41.27	44.41	11.9	15.40
12.6	42.23	18.52	12.7	40.14	25.55	12.7	32.10	27.18	12.8	41.44	44.32	12.9	15.71
13.6	42.36	18.77	13.7	40.50	25.72	13.7	33.42	27.26	13.8	41.61	44.25	13.9	15.98
14.6	42.49	19.04	14.7	40.83	25.91	14.7	34.70	27.36	14.8	41.79	44.20	14.9	16.27
15.6	42.60	19.31	15.7	41.15	26.11	15.7	35.94	27.47	15.8	41.97	44.17	15.9	16.55
16.6	42.70	19.57	16.7	41.45	26.31	16.7	37.11	27.59	16.8	42.13	44.16	16.9	16.84
17.6	42.79	19.83	17.7	41.73	26.50	17.7	38.21	27.71	17.8	42.29	44.14	17.9	17.12
18.6	42.88	20.08	18.7	41.99	26.69	18.7	39.27	27.82	18.8	42.44	44.14	18.9	17.38
19.6	42.97	20.31	19.7	42.25	26.87	19.7	40.28	27.92	19.8	42.59	44.12	19.9	17.65
20.6	43.06	20.53	20.7	42.51	27.03	20.7	41.28	28.01	20.8	42.73	44.10	20.9	17.87
21.6	43.16	20.74	21.7	42.77	27.19	21.7	42.28	28.09	21.8	42.87	44.06	21.9	18.08
22.6	43.26	20.96	22.7	43.05	27.34	22.7	43.32	28.16	22.8	43.01	44.02	22.9	18.31
23.6	43.36	21.18	23.7	43.34	27.49	23.7	44.42	28.23	23.8	43.16	43.97	23.9	18.54
24.6	43.47	21.41	24.7	43.64	27.65	24.7	45.57	28.32	24.8	43.32	43.93	24.9	18.75
25.6	43.58	21.67	25.7	43.95	27.84	25.7	46.77	28.43	25.8	43.49	43.90	25.9	19.07
26.6	43.69	21.96	26.7	44.26	28.06	26.7	48.00	28.56	26.8	43.67	43.89	26.9	19.36
27.6	43.78	22.27	27.7	44.56	28.31	27.7	49.22	28.72	27.8	43.85	43.91	27.9	19.74
28.6	43.86	22.59	28.7	44.83	28.57	28.7	50.37	28.91	28.8	44.03	43.96	28.9	20.10
29.6	43.93	22.92	29.6	45.07	28.84	29.7	51.44	29.11	29.8	44.20	44.03	29.9	20.47
30.6	43.99	23.24	30.6	45.29	29.12	30.7	52.41	29.32	30.8	44.36	44.13	30.9	20.84
31.6	44.03	23.55	31.6	45.48	29.39	31.7	53.28	29.53	31.8	44.52	44.22	31.9	21.18
7.34	+7.27		16.90	+16.87		57.74	+57.73		7.38	+7.31		18.13	
16 ^h 54 ^m	37 ^s .997		17 ^h 59 ^m	40 ^s .30		19 ^h 5 ^m	3 ^s .27		20 ^h 48 ^m	48 ^s .820		23 ^h 27 ^m	
+82° 10'	44'''.05		+86° 36'	51'''.19		+89° 0'	51'''.13		+82° 13'	2'''.89		+86° 50'	

[Eph 13]

♄ Ursæ Minoris. Mag. 4.4			♄ Ursæ Minoris. Mag. 4.4			♄ Ursæ Minoris. Mag. 6.6			76 Draconis. Mag. 5.7			39 H. Cephei. Mag. 5.6		
Mean Solar Date.	Right Ascension.	Declination North.	Mean Solar Date.	Right Ascension.	Declination North.	Mean Solar Date.	Right Ascension.	Declination North.	Mean Solar Date.	Right Ascension.	Declination North.	Mean Solar Date.	Right Ascension.	Declination North.
May	h m 16 54	° ' +82 10	May	h m 17 59	° ' +86 36	May	h m 19 4	° ' +89 0	May	h m 20 48	° ' +82 12	May	h m 23 27	° ' +86 50
	s "	"		s "	"		s "	"		s "	"		s "	"
0.6	43.99	23.24	0.6	45.29	29.12	0.7	52.41	29.32	0.8	44.36	44.13	0.9	20.84	12.80
1.6	44.03	23.55	1.6	45.48	29.39	1.7	53.28	29.53	1.8	44.52	44.22	1.9	21.18	12.68
2.6	44.08	23.83	2.6	45.66	29.63	2.7	54.09	29.72	2.8	44.66	44.31	2.9	21.49	12.58
3.6	44.13	24.09	3.6	45.83	29.85	3.7	54.89	29.89	3.8	44.80	44.38	3.9	21.78	12.47
4.6	44.19	24.34	4.6	46.02	30.05	4.7	55.71	30.03	4.8	44.93	44.43	4.9	22.05	12.34
5.6	44.26	24.59	5.6	46.23	30.25	5.7	56.57	30.17	5.7	45.07	44.47	5.9	22.33	12.19
6.6	44.33	24.84	6.6	46.46	30.46	6.7	57.52	30.31	6.7	45.22	44.51	6.9	22.61	12.03
7.6	44.41	25.11	7.6	46.70	30.68	7.7	58.55	30.46	7.7	45.38	44.54	7.9	22.92	11.86
8.6	44.49	25.41	8.6	46.96	30.92	8.7	59.61	30.63	8.7	45.55	44.59	8.9	23.25	11.68
9.6	44.56	25.74	9.6	47.21	31.19	9.7	60.70	30.82	9.7	45.72	44.65	9.8	23.62	11.52
10.6	44.63	26.08	10.6	47.44	31.48	10.7	61.77	31.04	10.7	45.89	44.74	10.8	24.01	11.37
11.6	44.69	26.43	11.6	47.66	31.79	11.7	62.78	31.28	11.7	46.07	44.85	11.8	24.42	11.24
12.6	44.73	26.79	12.6	47.86	32.11	12.7	63.74	31.54	12.7	46.25	44.99	12.8	24.83	11.13
13.6	44.76	27.14	13.6	48.03	32.43	13.7	64.62	31.80	13.7	46.41	45.14	13.8	25.24	11.04
14.6	44.79	27.48	14.6	48.19	32.74	14.7	65.42	32.05	14.7	46.56	45.29	14.8	25.63	10.96
15.6	44.81	27.81	15.6	48.32	33.04	15.6	66.17	32.31	15.7	46.71	45.46	15.8	26.00	10.89
16.6	44.83	28.13	16.6	48.44	33.33	16.6	66.86	32.55	16.7	46.85	45.61	16.8	26.37	10.84
17.6	44.85	28.43	17.6	48.56	33.61	17.6	67.53	32.78	17.7	46.98	45.76	17.8	26.71	10.79
18.6	44.87	28.71	18.6	48.68	33.87	18.6	68.17	33.00	18.7	47.11	45.90	18.8	27.04	10.74
19.5	44.90	28.99	19.6	48.81	34.12	19.6	68.84	33.21	19.7	47.25	46.02	19.8	27.35	10.67
20.5	44.94	29.27	20.6	48.95	34.37	20.6	69.55	33.42	20.7	47.38	46.13	20.8	27.68	10.60
21.5	44.97	29.56	21.6	49.11	34.63	21.6	70.31	33.63	21.7	47.52	46.25	21.8	28.02	10.51
22.5	45.01	29.87	22.6	49.28	34.90	22.6	71.11	33.85						

[Eph 15]

APPARENT PLACES OF CIRCUMPOLAR STARS

FOR THE UPPER TRANSIT AT WASHINGTON.

ε Ursæ Minoris. Mag. 4.4			δ Ursæ Minoris. Mag. 4.4			λ Ursæ Minoris. Mag. 6.6			76 Draconis. Mag. 5.7			39 H. Cephei. Mag. 5.6		
Mean Solar Date.	Right Ascension.	Declination North.	Mean Solar Date.	Right Ascension.	Declination North.	Mean Solar Date.	Right Ascension.	Declination North.	Mean Solar Date.	Right Ascension.	Declination North.	Mean Solar Date.	Right Ascension.	Declination North.
	h m	s		h m	s		h m	s		h m	s		h m	s
June	16 54	+82 10	June	17 59	+86 36	June	19 5	+89 0	June	20 48	+82 12	June	23 27	+86 50
0.5	44.97	32.94	0.6	49.99	37.87	0.6	16.35	36.50	0.7	48.92	48.30	0.8	32.03	10.38
1.5	44.96	33.22	1.6	50.02	38.14	1.6	16.72	36.75	1.7	49.02	48.50	1.8	32.36	10.40
2.5	44.96	33.49	2.6	50.08	38.41	2.6	17.18	36.99	2.7	49.14	48.68	2.8	32.69	10.40
3.5	44.95	33.77	3.6	50.15	38.69	3.6	17.70	37.24	3.7	49.27	48.86	3.8	33.04	10.39
4.5	44.95	34.08	4.5	50.24	38.98	4.6	18.26	37.50	4.7	49.39	49.05	4.8	33.41	10.37
5.5	44.95	34.42	5.5	50.33	39.30	5.6	18.86	37.78	5.7	49.53	49.26	5.8	33.81	10.35
6.5	44.94	34.77	6.5	50.40	39.64	6.6	19.45	38.08	6.7	49.67	49.49	6.8	34.24	10.36
7.5	44.92	35.13	7.5	50.45	39.99	7.6	19.99	38.41	7.7	49.81	49.74	7.8	34.68	10.38
8.5	44.90	35.49	8.5	50.49	40.36	8.6	20.47	38.75	8.7	49.95	50.01	8.8	35.11	10.42
9.5	44.86	35.85	9.5	50.51	40.73	9.6	20.87	39.10	9.7	50.08	50.29	9.8	35.56	10.48
10.5	44.81	36.20	10.5	50.50	41.09	10.6	21.20	39.45	10.7	50.20	50.58	10.8	35.99	10.56
11.5	44.76	36.54	11.5	50.47	41.44	11.6	21.44	39.79	11.6	50.31	50.87	11.8	36.40	10.65
12.5	44.71	36.86	12.5	50.43	41.77	12.6	21.63	40.11	12.6	50.41	51.17	12.8	36.79	10.75
13.5	44.65	37.16	13.5	50.37	42.09	13.6	21.78	40.43	13.6	50.51	51.45	13.8	37.16	10.86
14.5	44.59	37.44	14.5	50.32	42.40	14.6	21.89	40.74	14.6	50.60	51.72	14.7	37.52	10.97
15.5	44.54	37.71	15.5	50.27	42.69	15.6	22.01	41.03	15.6	50.68	51.98	15.7	37.86	11.07
16.5	44.50	37.97	16.5	50.24	42.97	16.6	22.16	41.30	16.6	50.77	52.23	16.7	38.19	11.16
17.5	44.46	38.24	17.5	50.21	43.25	17.6	22.35	41.58	17.6	50.86	52.48	17.7	38.52	11.23
18.5	44.42	38.53	18.5	50.20	43.54	18.6	22.60	41.86	18.6	50.96	52.72	18.7	38.87	11.30
19.5	44.38	38.83	19.5	50.19	43.86	19.6	22.88	42.16	19.6	51.08	52.97	19.7	39.25	11.37
20.5	44.34	39.15	20.5	50.18	44.20	20.6	23.17	42.48	20.6	51.19	53.25	20.7	39.66	11.44
21.5	44.29	39.49	21.5	50.15	44.56	21.5	23.42	42.84	21.6	51.30	53.55	21.7	40.09	11.54
22.5	44.22	39.84	22.5	50.09	44.93	22.5	23.60	43.21	22.6	51.41	53.89	22.7	40.53	11.67
23.5	44.14	40.18	23.5	49.99	45.30	23.5	23.67	43.59	23.6	51.51	54.24	23.7	40.97	11.82
24.4	44.05	40.51	24.5	49.87	45.67	24.5	23.62	43.97	24.6	51.59	54.60	24.7	41.39	12.00
25.4	43.94	40.82	25.5	49.72	46.02	25.5	23.46	44.34	25.6	51.66	54.96	25.7	41.77	12.21
26.4	43.83	41.10	26.5	49.56	46.34	26.5	23.23	44.69	26.6	51.72	55.32	26.7	42.12	12.42
27.4	43.73	41.35	27.5	49.40	46.64	27.5	22.98	45.01	27.6	51.77	55.65	27.7	42.45	12.61
28.4	43.64	41.58	28.5	49.25	46.91	28.5	22.76	45.30	28.6	51.82	55.96	28.7	42.76	12.80
29.4	43.57	41.81	29.5	49.12	47.18	29.5	22.60	45.59	29.6	51.87	56.25	29.7	43.06	12.96
30.4	43.49	42.05	30.5	49.00	47.46	30.5	22.51	45.88	30.6	51.93	56.53	30.7	43.37	13.11
31.4	43.42	42.30	31.5	48.90	47.74	31.5	22.47	46.18	31.6	52.00	56.82	31.7	43.69	13.21
7.35	+7.28		16.92	+16.89		57.96	+57.95		7.38	+7.31		18.12	+18.09	
16 ^h 54 ^m	37°.997		17 ^h 59 ^m	40°.30		19 ^h 5 ^m	3°.27		20 ^h 48 ^m	48°.820		23 ^h 27 ^m	44°.65	
+82° 10'	44''.05		+86° 36'	51''.19		+89° 0'	51''.13		+82° 13'	2''.89		+86° 50'	19''.16	

[Eph 13]

APPARENT PLACES OF CIRCUMPOLAR STARS

FOR THE UPPER TRANSIT AT WASHINGTON.

Ursae Minoris. Mag. 4.4			Ursae Minoris. Mag. 4.4			Ursae Minoris. Mag. 6.6			76 Draconis. Mag. 5.7			39 H. Cephei. Mag. 5.6		
Declination North.	Mean Solar Date.	Right Ascension.	Declination North.	Mean Solar Date.	Right Ascension.	Declination North.	Mean Solar Date.	Right Ascension.	Declination North.	Mean Solar Date.	Right Ascension.	Declination North.	Mean Solar Date.	Right Ascension.
h m			h m			h m			h m			h m		
4 +82 10	July	17 59	+86 36	July	19 5	+89 0	July	20 48	+82 12	July	23 27	+86 50		
"		"	"		"	"		"	"		"	"		
9 42.05	0.5	49.00	47.46	0.5	22.51	45.88	0.6	51.93	56.53	0.7	43.37	13.10		
2 42.30	1.5	48.90	47.74	1.5	22.47	46.18	1.6	52.00	56.82	1.7	43.69	13.24		
5 42.57	2.5	48.81	48.04	2.5	22.47	46.49	2.6	52.08	57.11	2.7	44.05	13.38		
8 42.86	3.5	48.72	48.36	3.5	22.48	46.82	3.6	52.16	57.42	3.7	44.43	13.53		
9 43.16	4.5	48.61	48.70	4.5	22.46	47.17	4.6	52.25	57.75	4.7	44.82	13.69		
0 43.47	5.5	48.49	49.05	5.5	22.38	47.54	5.6	52.33	58.10	5.7	45.22	13.87		
0 43.78	6.5	48.34	49.40	6.5	22.22	47.91	6.6	52.39	58.47	6.7	45.62	14.07		
9 44.08	7.5	48.16	49.74	7.5	21.98	48.28	7.6	52.45	58.84	7.7	46.00	14.29		
6 44.35	8.5	47.97	50.07	8.5	21.66	48.64	8.6	52.50	59.22	8.7	46.37	14.52		
4 44.61	9.5	47.76	50.38	9.5	21.28	48.99	9.6	52.55	59.60	9.7	46.71	14.77		
1 44.85	10.5	47.54	50.68	10.5	20.85	49.34	10.6	52.58	59.97	10.7	47.03	15.02		
9 45.06	11.4	47.31	50.97	11.5	20.38	49.66	11.6	52.60	60.32	11.7	47.33	15.28		
7 45.27	12.4	47.10	51.23	12.5	19.91	49.97	12.6	52.62	60.66	12.7	47.61	15.52		
5 45.46	13.4	46.89	51.48	13.5	19.45	50.26	13.6	52.64	60.98	13.7	47.88	15.75		
4 45.65	14.4	46.69	51.73	14.5	19.04	50.54	14.6	52.67	61.30	14.7	48.15	15.97		
4 45.85	15.4	46.51	51.98	15.5	18.68	50.83	15.6	52.70	61.61	15.7	48.42	16.18		
4 46.07	16.4	46.33	52.25	16.5	18.37	51.13	16.6	52.74	61.92	16.7	48.72	16.39		
4 46.31	17.4	46.15	52.53	17.5	18.06	51.45	17.5	52.79	62.25	17.7	49.04	16.60		
2 46.55	18.4	45.96	52.83	18.5	17.76	51.78	18.5	52.83	62.61	18.7	49.38	16.82		
0 46.82	19.4	45.76	53.15	19.5	17.40	52.13	19.5	52.87	62.99	19.7	49.74	17.07		
6 47.08	20.4	45.53	53.49	20.5	16.94	52.50	20.5	52.91	63.39	20.7	50.10	17.34		
2 47.33	21.4	45.26	53.81	21.5	16.37	52.88	21.5	52.94	63.80	21.6	50.44	17.64		
6 47.55	22.4	44.96	54.11	22.5	15.67	53.24	22.5	52.94	64.22	22.6	50.76	17.96		
0 47.75	23.4	44.64	54.39	23.5	14.90	53.59	23.5	52.93	64.63	23.6	51.04	18.30		
3 47.92	24.4	44.32	54.64	24.5	14.09	53.91	24.5	52.92	65.02	24.6	51.28	18.62		
8 48.06	25.4	44.01	54.86	25.5	13.28	54.20	25.5	52.89	65.38	25.6	51.49	18.94		
4 48.20	26.4	43.71	55.07	26.5	12.51	54.47	26.5	52.88	65.72	26.6	51.70	19.23		
1 48.33	27.4	43.44	55.28	27.5	11.81	54.73	27.5	52.87	66.05	27.6	51.90	19.51		
8 48.48	28.4	43.19	55.49	28.4	11.20	54.99	28.5	52.85	66.37	28.6	52.12	19.77		
5 48.64	29.4	42.95	55.72	29.4	10.62	55.27	29.5	52.86	66.70	29.6	52.37	20.03		
2 48.82	30.4	42.71	55.96	30.4	10.05	55.57	30.5	52.87	67.03	30.6	52.63	20.29		
9 49.01	31.4	42.46	56.23	31.4	9.49	55.88	31.5	52.88	67.39	31.6	52.92	20.56		
+7.28	16.93	+16.90	58.12	+58.11	7.38	+7.32	18.13	+18.10						
37°.997	17 ^h 59 ^m	40°.30	19 ^h 5 ^m	3°.27	20 ^h 48 ^m	48°.820	23 ^h 27 ^m	44°.653						
44''.05	+86° 36'	51''.19	+89° 0'	51''.13	+82° 13'	2''.89	+86° 50'	19''.16						

[Eph 13]

APPARENT PLACES OF CIRCUMPOLAR STARS

FOR THE UPPER TRANSIT AT WASHINGTON.

ε Ursæ Minoris. Mag. 4.4			δ Ursæ Minoris. Mag. 4.4			λ Ursæ Minoris. Mag. 6.6			76 Draconis. Mag. 5.7			39 H. Cephei. Mag. 5.6		
Mean Solar Date.	Right Ascension.	Declination North.	Mean Solar Date.	Right Ascension.	Declination North.	Mean Solar Date.	Right Ascension.	Declination North.	Mean Solar Date.	Right Ascension.	Declination North.	Mean Solar Date.	Right Ascension.	Declination North.
Aug.	h m 16 54	° +82 10	Aug.	h m 17 59	° +86 36	Aug.	h m 19 4	° +89 0	Aug.	h m 20 48	° +82 13	Aug.	h m 23 27	° +86 5
	s "	"		s "	"		s "	"		s "	"		s "	"
0.3	39.79	49.01	0.4	42.46	56.23	0.4	69.49	55.88	0.5	52.88	7.39	0.6	52.92	20.1
1.3	39.65	49.22	1.4	42.19	56.50	1.4	68.87	56.21	1.5	52.89	7.78	1.6	53.22	20.1
2.3	39.50	49.42	2.4	41.90	56.78	2.4	68.19	56.55	2.5	52.89	8.18	2.6	53.51	21.
3.3	39.33	49.61	3.4	41.59	57.05	3.4	67.42	56.89	3.5	52.88	8.58	3.6	53.79	21.
4.3	39.17	49.79	4.4	41.27	57.32	4.4	66.59	57.22	4.5	52.87	8.98	4.6	54.05	21.
5.3	38.99	49.94	5.4	40.92	57.57	5.4	65.69	57.54	5.5	52.84	9.38	5.6	54.29	22
6.3	38.82	50.08	6.4	40.56	57.79	6.4	64.73	57.85	6.5	52.80	9.77	6.6	54.51	22
7.3	38.65	50.19	7.4	40.20	58.00	7.4	63.74	58.13	7.5	52.76	10.15	7.6	54.70	22
8.3	38.48	50.29	8.4	39.84	58.18	8.4	62.74	58.40	8.5	52.71	10.51	8.6	54.87	23
9.3	38.31	50.37	9.4	39.50	58.35	9.4	61.75	58.65	9.5	52.66	10.86	9.6	55.02	23
10.3	38.16	50.44	10.4	39.16	58.51	10.4	60.79	58.89	10.5	52.61	11.19	10.6	55.16	23
11.3	38.01	50.53	11.4	38.84	58.67	11.4	59.87	59.12	11.5	52.56	11.52	11.6	55.31	23
12.3	37.86	50.62	12.4	38.52	58.84	12.4	59.02	59.37	12.5	52.52	11.84	12.6	55.47	23
13.3	37.71	50.72	13.4	38.22	59.03	13.4	58.20	59.62	13.5	52.50	12.16	13.6	55.66	23
14.3	37.56	50.85	14.4	37.91	59.23	14.4	57.39	59.89	14.5	52.47	12.51	14.6	55.87	23
15.3	37.40	50.98	15.4	37.58	59.45	15.4	56.54	60.18	15.5	52.44	12.88	15.6	56.09	23
16.3	37.23	51.12	16.3	37.23	59.68	16.4	55.62	60.49	16.5	52.41	13.27	16.6	56.31	23
17.3	37.05	51.26	17.3	36.86	59.92	17.4	54.60	60.81	17.5	52.38	13.68	17.6	56.53	23
18.3	36.86	51.37	18.3	36.46	60.15	18.4	53.47	61.12	18.5	52.32	14.09	18.6	56.73	23
19.3	36.66	51.46	19.3	36.03	60.34	19.4	52.25	61.41	19.5	52.24	14.50	19.6	56.89	23
20.3	36.47	51.51	20.3	35.60	60.50	20.4	50.96	61.67	20.5	52.16	14.89	20.6	57.02	23
21.3	36.28	51.53	21.3	35.17	60.63	21.4	49.67	61.90	21.5	52.08	15.25	21.6	57.11	23
22.3	36.10	51.53	22.3	34.76	60.74	22.4	48.41	62.11	22.5	51.98	15.58	22.6	57.18	23
23.3	35.92	51.54	23.3	34.37	60.84	23.4	47.22	62.30	23.4	51.89	15.89	23.6	57.24	23
24.3	35.76	51.55	24.3	34.00	60.95	24.4	46.10	62.49	24.4	51.81	16.19	24.6	57.32	23
25.3	35.61	51.58	25.3	33.65	61.07	25.4	45.05	62.70	25.4	51.75	16.50	25.6	57.42	23
26.3	35.45	51.63	26.3	33.31	61.21	26.4	44.05	62.92	26.4	51.69	16.81	26.6	57.54	23
27.3	35.29	51.68	27.3	32.96	61.36	27.4	43.04	63.15	27.4	51.62	17.13	27.5	57.67	23
28.3	35.12	51.75	28.3	32.60	61.52	28.4	41.99	63.39	28.4	51.56	17.47	28.5	57.82	31
29.3	34.95	51.83	29.3	32.22	61.69	29.4	40.90	63.64	29.4	51.51	17.83	29.5	57.97	31
30.3	34.76	51.89	30.3	31.83	61.85	30.4	39.74	63.90	30.4	51.43	18.21	30.5	58.10	31
31.3	34.57	51.93	31.3	31.41	62.01	31.4	38.50	64.15	31.4	51.35	18.57	31.5	58.23	31
7.35	+7.28		16.94	+16.91		58.27	+58.26		7.39	+7.32		18.14	+18.14	
16 ^h 54 ^m	37 ^s .997		17 ^h 59 ^m	40 ^s .30		19 ^h 5 ^m	3 ^s .27		20 ^h 48 ^m	48 ^s .820		23 ^h 27 ^m	44 ^s .	
+82° 10'	44'' .05		+86° 36'	51'' .19		+89° 0'	51'' .13		+82° 13'	2'' .89		+86° 50'	19''.	

[Eph 15]

APPARENT PLACES OF CIRCUMPOLAR STARS
FOR THE UPPER TRANSIT AT WASHINGTON.

ε Ursæ Minoris. Mag. 4.4			δ Ursæ Minoris. Mag. 4.4			λ Ursæ Minoris. Mag. 6.6			76 Draconis. Mag. 5.7			39 H. Cephei. Mag. 5.6		
Mean Solar Date.	Right Ascension.	Declination North.	Mean Solar Date.	Right Ascension.	Declination North.	Mean Solar Date.	Right Ascension.	Declination North.	Mean Solar Date.	Right Ascension.	Declination North.	Mean Solar Date.	Right Ascension.	Declination North.
Sept.	h m	° '	Sept.	h m	° '	Sept.	h m	° '	Sept.	h m	° '	Sept.	h m	° '
	16 54	+82 10		17 59	+86 37		19 3	+89 1		20 48	+82 13		23 27	+86 50
	s	"		s	"		s	"		s	"		s	"
0.3	34.57	51.93	0.3	31.41	2.01	0.4	98.50	4.15	0.4	51.35	18.57	0.5	58.23	31.43
1.3	34.38	51.96	1.3	30.98	2.14	1.4	97.19	4.39	1.4	51.26	18.93	1.5	58.33	31.84
2.3	34.18	51.97	2.3	30.54	2.26	2.3	95.84	4.61	2.4	51.16	19.29	2.5	58.41	32.26
3.3	33.99	51.96	3.3	30.09	2.36	3.3	94.46	4.81	3.4	51.05	19.64	3.5	58.45	32.66
4.3	33.80	51.92	4.3	29.64	2.44	4.3	93.05	4.99	4.4	50.94	19.97	4.5	58.48	33.06
5.2	33.61	51.87	5.3	29.20	2.49	5.3	91.66	5.16	5.4	50.82	20.27	5.5	58.49	33.45
6.2	33.43	51.82	6.3	28.78	2.54	6.3	90.31	5.31	6.4	50.70	20.56	6.5	58.48	33.83
7.2	33.26	51.76	7.3	28.37	2.58	7.3	88.98	5.45	7.4	50.59	20.84	7.5	58.47	34.20
8.2	33.10	51.71	8.3	27.98	2.63	8.3	87.72	5.59	8.4	50.49	21.12	8.5	58.48	34.55
9.2	32.94	51.68	9.3	27.61	2.69	9.3	86.52	5.74	9.4	50.39	21.39	9.5	58.50	34.90
10.2	32.77	51.65	10.3	27.23	2.77	10.3	85.34	5.91	10.4	50.30	21.68	10.5	58.54	35.25
11.2	32.60	51.65	11.3	26.85	2.86	11.3	84.15	6.10	11.4	50.21	21.99	11.5	58.61	35.61
12.2	32.42	51.66	12.3	26.45	2.97	12.3	82.91	6.30	12.4	50.12	22.31	12.5	58.69	35.99
13.2	32.23	51.66	13.3	26.01	3.08	13.3	81.59	6.52	13.4	50.02	22.65	13.5	58.76	36.40
14.2	32.03	51.64	14.3	25.55	3.18	14.3	80.16	6.73	14.4	49.91	23.01	14.5	58.81	36.83
15.2	31.83	51.59	15.3	25.07	3.26	15.3	78.64	6.93	15.4	49.79	23.35	15.5	58.82	37.27
16.2	31.62	51.52	16.3	24.58	3.31	16.3	77.05	7.10	16.4	49.65	23.67	16.5	58.80	37.71
17.2	31.41	51.42	17.3	24.10	3.32	17.3	75.44	7.23	17.4	49.50	23.98	17.5	58.75	38.15
18.2	31.22	51.30	18.3	23.63	3.31	18.3	73.85	7.34	18.4	49.35	24.26	18.5	58.67	38.56
19.2	31.04	51.17	19.3	23.19	3.29	19.3	72.34	7.42	19.4	49.20	24.51	19.5	58.58	38.95
20.2	30.88	51.04	20.3	22.77	3.27	20.3	70.90	7.50	20.4	49.06	24.74	20.5	58.49	39.32
21.2	30.71	50.92	21.3	22.36	3.26	21.3	69.55	7.59	21.4	48.93	24.97	21.5	58.42	39.67
22.2	30.55	50.82	22.2	21.97	3.25	22.3	68.25	7.68	22.4	48.82	25.20	22.5	58.37	40.00
23.2	30.39	50.74	23.2	21.58	3.27	23.3	66.97	7.80	23.4	48.71	25.44	23.5	58.34	40.35
24.2	30.23	50.67	24.2	21.18	3.29	24.3	65.68	7.93	24.4	48.60	25.70	24.5	58.34	40.71
25.2	30.06	50.60	25.2	20.77	3.33	25.3	64.35	8.06	25.4	48.48	25.97	25.5	58.33	41.09
26.2	29.88	50.53	26.2	20.35	3.36	26.3	62.97	8.19	26.4	48.35	26.25	26.5	58.31	41.47
27.2	29.70	50.45	27.2	19.91	3.39	27.3	61.51	8.33	27.4	48.22	26.54	27.5	58.28	41.86
28.2	29.51	50.35	28.2	19.44	3.40	28.3	59.99	8.46	28.3	48.08	26.82	28.5	58.23	42.27
29.2	29.32	50.23	29.2	18.97	3.40	29.3	58.43	8.57	29.3	47.94	27.09	29.5	58.16	42.69
30.2	29.13	50.08	30.2	18.51	3.37	30.3	56.83	8.67	30.3	47.79	27.35	30.5	58.07	43.10
31.2	28.95	49.92	31.2	18.05	3.32	31.3	55.22	8.74	31.3	47.62	27.60	31.5	57.93	43.50
7.35	+7.28		16.95	+16.92		58.38	+58.38		7.39	+7.32		18.16	+18.14	
16 ^h 54 ^m	37 ^s .997		17 ^h 59 ^m	40 ^s .30		19 ^h 3 ^m	3 ^s .27		20 ^h 48 ^m	48 ^s .820		23 ^h 27 ^m	44 ^s .653	
+82° 10'	44'' .05		+86° 36'	51'' .19		+89° 0'	51'' .13		+82° 13'	2'' .89		+86° 50'	19'' .16	

[Eph 15]

APPARENT PLACES OF CIRCUMPOLAR STARS

FOR THE UPPER TRANSIT AT WASHINGTON.

ϵ Ursae Minoris. Mag. 4.4			δ Ursae Minoris. Mag. 4.4			λ Ursae Minoris. Mag. 6.6			76 Draconis. Mag. 5.7			89 H. Cephe Mag. 5.6		
Mean Solar Date.	Right Ascension.	Declination North.	Mean Solar Date.	Right Ascension.	Declination North.	Mean Solar Date.	Right Ascension.	Declination North.	Mean Solar Date.	Right Ascension.	Declination North.	Mean Solar Date.	Right Ascension.	Declination North.
Oct.	h m	° ' "	Oct.	h m	° ' "	Oct.	h m	° ' "	Oct.	h m	° ' "	Oct.	h m	° ' "
16.54	+82.10	"	17.59	+86.36	"	19.3	+89.1	"	20.48	+82.13	"	23.27	+86.50	"
0.2	29.13	50.08	0.2	18.51	63.37	0.3	56.83	8.67	0.3	47.79	27.35	0.5	58.07	
1.2	28.95	49.92	1.2	18.05	63.32	1.3	55.22	8.74	1.3	47.62	27.60	1.5	57.93	
2.2	28.78	49.75	2.2	17.59	63.25	2.3	53.62	8.79	2.3	47.45	27.82	2.4	57.79	
3.2	28.60	49.55	3.2	17.14	63.17	3.3	52.05	8.82	3.3	47.29	28.02	3.4	57.63	
4.2	28.44	49.35	4.2	16.72	63.08	4.3	50.52	8.83	4.3	47.13	28.20	4.4	57.47	
5.2	28.29	49.16	5.2	16.31	62.99	5.3	49.06	8.85	5.3	46.97	28.38	5.4	57.31	
6.2	28.14	48.98	6.2	15.92	62.90	6.3	47.66	8.87	6.3	46.82	28.55	6.4	57.16	
7.2	28.00	48.82	7.2	15.54	62.84	7.3	46.31	8.90	7.3	46.68	28.73	7.4	57.03	
8.2	27.84	48.68	8.2	15.15	62.79	8.2	44.97	8.95	8.3	46.55	28.93	8.4	56.93	
9.2	27.69	48.54	9.2	14.74	62.75	9.2	43.59	9.02	9.3	46.41	29.14	9.4	56.85	
10.2	27.53	48.41	10.2	14.32	62.73	10.2	42.17	9.11	10.3	46.27	29.37	10.4	56.77	
11.2	27.35	48.27	11.2	13.88	62.70	11.2	40.65	9.19	11.3	46.12	29.61	11.4	56.67	
12.1	27.17	48.10	12.2	13.42	62.65	12.2	39.03	9.26	12.3	45.96	29.85	12.4	56.55	
13.1	26.98	47.90	13.2	12.94	62.58	13.2	37.34	9.31	13.3	45.78	30.08	13.4	56.39	
14.1	26.80	47.68	14.2	12.46	62.48	14.2	35.63	9.32	14.3	45.60	30.29	14.4	56.19	
15.1	26.62	47.44	15.2	12.00	62.35	15.2	33.93	9.31	15.3	45.41	30.46	15.4	55.96	
16.1	26.47	47.18	16.2	11.56	62.19	16.2	32.29	9.27	16.3	45.23	30.60	16.4	55.72	
17.1	26.33	46.91	17.2	11.15	62.02	17.2	30.74	9.22	17.3	45.05	30.72	17.4	55.47	
18.1	26.19	46.66	18.2	10.77	61.86	18.2	29.29	9.16	18.3	44.88	30.83	18.4	55.24	
19.1	26.07	46.42	19.2	10.40	61.72	19.2	27.91	9.11	19.3	44.72	30.94	19.4	55.02	
20.1	25.94	46.21	20.2	10.04	61.59	20.2	26.58	9.08	20.3	44.57	31.06	20.4	54.83	
21.1	25.80	46.01	21.2	9.69	61.48	21.2	25.26	9.07	21.3	44.42	31.19	21.4	54.66	
22.1	25.67	45.82	22.2	9.32	61.38	22.2	23.92	9.07	22.3	44.28	31.33	22.4	54.50	
23.1	25.54	45.63	23.2	8.94	61.28	23.2	22.53	9.07	23.3	44.13	31.49	23.4	54.33	
24.1	25.39	45.43	24.2	8.54	61.17	24.2	21.09	9.07	24.3	43.97	31.65	24.4	54.16	
25.1	25.24	45.21	25.2	8.13	61.06	25.2	19.58	9.07	25.3	43.80	31.81	25.4	53.98	
26.1	25.08	44.97	26.2	7.71	60.93	26.2	18.04	9.05	26.3	43.63	31.95	26.4	53.76	
27.1	24.93	44.72	27.2	7.29	60.77	27.2	16.47	9.01	27.3	43.45	32.08	27.4	53.52	
28.1	24.79	44.44	28.1	6.88	60.60	28.2	14.88	8.95	28.3	43.27	32.19	28.4	53.26	
29.1	24.65	44.15	29.1	6.47	60.41	29.2	13.31	8.87	29.3	43.08	32.29	29.4	52.97	
30.1	24.52	43.84	30.1	6.08	60.20	30.2	11.77	8.77	30.3	42.89	32.37	30.4	52.67	
31.1	24.39	43.53	31.1	5.71	59.98	31.2	10.28	8.65	31.3	42.71	32.42	31.4	52.37	
7.35	+7.28		16.95	+16.92		58.42	+58.42		7.39	+7.32		18.18		
16 ^h 54 ^m	37°.997		17 ^h 59 ^m	40°.30		19 ^h 5 ^m	3°.27		20 ^h 48 ^m	48°.820		23 ^h 27 ^m		
+82° 10'	44'' .05		+86° 36'	51'' .19		+89° 0'	51'' .13		+82° 13'	2'' .89		+86° 50'		

[Rph 15]

APPARENT PLACES OF CIRCUMPOLAR STARS
FOR THE UPPER TRANSIT AT WASHINGTON.

ε Ursæ Minoris. Mag. 4.4			δ Ursæ Minoris. Mag. 4.4			λ Ursæ Minoris. Mag. 6.6			76 Draconis. Mag. 5.7			39 H. Cephei. Mag. 5.6		
Mean Solar Date.	Right Ascension.	Declination North.	Mean Solar Date.	Right Ascension.	Declination North.	Mean Solar Date.	Right Ascension.	Declination North.	Mean Solar Date.	Right Ascension.	Declination North.	Mean Solar Date.	Right Ascension.	Declination North.
Nov. 16 54	h m	° ' "	Nov. 17 58	h m	° ' "	Nov. 19 2	h m	° ' "	Nov. 20 48	h m	° ' "	Nov. 23 27	h m	° ' "
	s	"		s	"		s	"		s	"		s	"
0.1 24.39	43.53	0.1 65.71	59.98	0.2 70.28	8.65	0.3 42.71	32.42	0.4 52.37	53.97					
1.1 24.28	43.22	1.1 65.35	59.76	1.2 68.86	8.53	1.3 42.52	32.46	1.4 52.07	54.25					
2.1 24.17	42.92	2.1 65.02	59.55	2.2 67.51	8.41	2.3 42.35	32.50	2.4 51.78	54.51					
3.1 24.07	42.64	3.1 64.70	59.34	3.2 66.22	8.30	3.3 42.18	32.53	3.4 51.50	54.76					
4.1 23.97	42.38	4.1 64.39	59.15	4.2 64.96	8.20	4.2 42.02	32.57	4.4 51.25	55.01					
5.1 23.86	42.13	5.1 64.06	58.98	5.2 63.70	8.12	5.2 41.87	32.64	5.4 51.01	55.27					
6.1 23.75	41.89	6.1 63.72	58.83	6.2 62.40	8.06	6.2 41.72	32.73	6.4 50.79	55.55					
7.1 23.63	41.64	7.1 63.37	58.67	7.2 61.02	8.00	7.2 41.56	32.82	7.4 50.56	55.85					
8.1 23.50	41.38	8.1 63.00	58.50	8.2 59.56	7.94	8.2 41.40	32.92	8.3 50.32	56.17					
9.1 23.37	41.09	9.1 62.60	58.31	9.2 58.04	7.86	9.2 41.22	33.01	9.3 50.04	56.49					
10.1 23.23	40.78	10.1 62.20	58.09	10.2 56.47	7.75	10.2 41.03	33.08	10.3 49.72	56.81					
11.1 23.11	40.43	11.1 61.81	57.84	11.2 54.91	7.61	11.2 40.82	33.12	11.3 49.37	57.12					
12.1 23.00	40.07	12.1 61.45	57.57	12.2 53.40	7.43	12.2 40.62	33.12	12.3 49.00	57.40					
13.1 22.90	39.71	13.1 61.12	57.29	13.1 51.99	7.24	13.2 40.43	33.10	13.3 48.62	57.64					
14.1 22.83	39.35	14.1 60.82	57.00	14.1 50.68	7.04	14.2 40.26	33.06	14.3 48.25	57.86					
15.1 22.76	39.01	15.1 60.55	56.72	15.1 49.47	6.86	15.2 40.09	33.01	15.3 47.90	58.06					
16.1 22.69	38.69	16.1 60.29	56.47	16.1 48.33	6.68	16.2 39.92	32.98	16.3 47.58	58.26					
17.0 22.62	38.39	17.1 60.04	56.23	17.1 47.23	6.52	17.2 39.77	32.95	17.3 47.27	58.45					
18.0 22.55	38.11	18.1 59.78	56.01	18.1 46.12	6.38	18.2 39.63	32.94	18.3 46.99	58.65					
19.0 22.48	37.83	19.1 59.52	55.79	19.1 44.99	6.24	19.2 39.48	32.94	19.3 46.72	58.86					
20.0 22.39	37.54	20.1 59.24	55.57	20.1 43.81	6.11	20.2 39.32	32.93	20.3 46.43	59.08					
21.0 22.30	37.24	21.1 58.95	55.35	21.1 42.59	5.97	21.2 39.16	32.94	21.3 46.13	59.31					
22.0 22.22	36.93	22.1 58.64	55.11	22.1 41.32	5.82	22.2 38.99	32.93	22.3 45.81	59.55					
23.0 22.14	36.59	23.1 58.34	54.85	23.1 40.02	5.65	23.2 38.81	32.92	23.3 45.46	59.78					
24.0 22.05	36.24	24.1 58.05	54.57	24.1 38.72	5.46	24.2 38.63	32.89	24.3 45.09	60.00					
25.0 21.98	35.87	25.1 57.76	54.27	25.1 37.44	5.25	25.2 38.45	32.83	25.3 44.71	60.21					
26.0 21.92	35.51	26.1 57.49	53.96	26.1 36.20	5.02	26.2 38.27	32.75	26.3 44.32	60.40					
27.0 21.86	35.13	27.1 57.24	53.63	27.1 35.00	4.77	27.2 38.09	32.65	27.3 43.91	60.58					
28.0 21.82	34.75	28.1 57.01	53.30	28.1 33.88	4.52	28.2 37.92	32.54	28.3 43.50	60.73					
29.0 21.79	34.37	29.1 56.81	52.97	29.1 32.83	4.26	29.2 37.76	32.42	29.3 43.09	60.86					
30.0 21.76	34.01	30.1 56.63	52.66	30.1 31.87	4.01	30.2 37.61	32.30	30.3 42.71	60.98					
31.0 21.73	33.67	31.1 56.45	52.37	31.1 30.96	3.78	31.2 37.47	32.18	31.3 42.35	61.10					
7.35	+7.28	16.94	+16.91	58.38	+58.37	7.39	+7.33	18.19	+18.17					
16 ^h 54 ^m	37 ^s .997	17 ^h 59 ^m	40 ^s .30	19 ^h 5 ^m	3 ^s .27	20 ^h 48 ^m	48 ^s .820	23 ^h 27 ^m	44 ^s .653					
+82° 10'	44'' .05	+86° 36'	51'' .19	+89° 0'	51'' .13	+82° 13'	2'' .89	+86° 50'	19'' .16					

[Eph 15]

APPARENT PLACES OF CIRCUMPOLAR STARS

FOR THE UPPER TRANSIT AT WASHINGTON

ε Ursæ Minoris. Mag. 4.4			δ Ursæ Minoris. Mag. 4.4			λ Ursæ Minoris. Mag. 6.6			76 Draconis. Mag. 5.7			39 H. Cephei. Mag. 5.6		
Mean Solar Date.	Right Ascension.	Declination North.	Mean Solar Date.	Right Ascension.	Declination North.	Mean Solar Date.	Right Ascension.	Declination North.	Mean Solar Date.	Right Ascension.	Declination North.	Mean Solar Date.	Right Ascension.	Declination North.
Dec. °	h m 16 54	° ' " +82 10	Dec. °	h m 17 58	° ' " +86 36	Dec. °	h m 19 2	° ' " +89 0	Dec. °	h m 20 48	° ' " +82 13	Dec. °	h m 23 27	° ' " +86 51
1.0	21.73	33.67	1.1	56.45	52.37	1.1	30.96	63.78	1.2	37.47	32.18	1.3	42.35	1.10
2.0	21.70	33.35	2.1	56.27	52.10	2.1	30.07	63.56	2.2	37.33	32.08	2.3	42.02	1.22
3.0	21.67	33.05	3.1	56.09	51.84	3.1	29.15	63.36	3.2	37.19	31.99	3.3	41.71	1.36
4.0	21.62	32.75	4.0	55.89	51.59	4.1	28.20	63.18	4.2	37.04	31.92	4.3	41.39	1.51
5.0	21.57	32.43	5.0	55.67	51.33	5.1	27.18	62.99	5.2	36.90	31.86	5.3	41.06	1.67
5.9	21.51	32.09	6.0	55.43	51.05	6.1	26.07	62.79	6.2	36.75	31.80	6.3	40.71	1.85
6.9	21.45	31.74	7.0	55.18	50.75	7.1	24.91	62.57	7.2	36.58	31.72	7.3	40.33	2.03
7.9	21.41	31.36	8.0	54.94	50.42	8.1	23.76	62.32	8.2	36.40	31.61	8.3	39.92	2.19
8.9	21.38	30.95	9.0	54.73	50.07	9.1	22.64	62.04	9.2	36.23	31.47	9.3	39.47	2.33
9.9	21.35	30.54	10.0	54.54	49.70	10.1	21.62	61.74	10.1	36.05	31.31	10.3	39.02	2.44
10.9	21.34	30.13	11.0	54.39	49.33	11.1	20.70	61.43	11.1	35.89	31.12	11.3	38.57	2.53
11.9	21.35	29.75	12.0	54.27	48.97	12.1	19.90	61.13	12.1	35.75	30.92	12.3	38.14	2.58
12.9	21.36	29.38	13.0	54.17	48.63	13.1	19.20	60.83	13.1	35.62	30.72	13.3	37.74	2.62
13.9	21.37	29.03	14.0	54.08	48.31	14.1	18.56	60.55	14.1	35.49	30.52	14.2	37.36	2.65
14.9	21.39	28.71	15.0	54.00	48.01	15.1	17.94	60.29	15.1	35.38	30.35	15.2	37.02	2.69
15.9	21.39	28.39	16.0	53.91	47.72	16.1	17.31	60.04	16.1	35.26	30.19	16.2	36.68	2.74
16.9	21.40	28.08	17.0	53.81	47.43	17.1	16.65	59.80	17.1	35.14	30.03	17.2	36.34	2.80
17.9	21.40	27.76	18.0	53.70	47.14	18.1	15.96	59.56	18.1	35.02	29.88	18.2	36.00	2.86
18.9	21.39	27.43	19.0	53.58	46.84	19.1	15.22	59.31	19.1	34.89	29.72	19.2	35.64	2.94
19.9	21.39	27.09	20.0	53.46	46.53	20.0	14.46	59.04	20.1	34.76	29.56	20.2	35.26	3.01
20.9	21.39	26.73	21.0	53.33	46.19	21.0	13.69	58.76	21.1	34.62	29.38	21.2	34.85	3.07
21.9	21.40	26.36	21.9	53.22	45.84	22.0	12.93	58.45	22.1	34.48	29.18	22.2	34.43	3.12
22.9	21.41	25.98	22.9	53.12	45.49	23.0	12.22	58.13	23.1	34.34	28.96	23.2	34.00	3.15
23.9	21.43	25.59	23.9	53.05	45.12	24.0	11.56	57.79	24.1	34.21	28.72	24.2	33.56	3.16
24.9	21.47	25.20	24.9	53.00	44.74	25.0	10.96	57.45	25.1	34.08	28.47	25.2	33.11	3.16
25.9	21.51	24.82	25.9	52.97	44.36	26.0	10.47	57.11	26.1	33.96	28.21	26.2	32.68	3.13
26.9	21.57	24.46	26.9	52.97	43.99	27.0	10.05	56.77	27.1	33.85	27.93	27.2	32.27	3.08
27.9	21.63	24.12	27.9	52.98	43.65	28.0	9.71	56.44	28.1	33.75	27.67	28.2	31.88	3.02
28.9	21.69	23.81	28.9	53.00	43.33	29.0	9.41	56.13	29.1	33.66	27.42	29.2	31.52	2.97
29.9	21.74	23.51	29.9	53.01	43.03	30.0	9.11	55.85	30.1	33.57	27.18	30.2	31.18	2.93
30.9	21.78	23.21	30.9	53.01	42.74	31.0	8.79	55.58	31.1	33.48	26.97	31.2	30.85	2.90
31.9	21.82	22.92	31.9	53.00	42.45	32.0	8.39	55.32	32.1	33.40	26.77	32.2	30.52	2.88
7.34 +7.27 16.93 +16.90			58.28 +58.27			7.39 +7.32			18.20 +18.18					
16 ^h 54 ^m 37 ^s .997			17 ^h 59 ^m 40 ^s .30			20 ^h 48 ^m 48 ^s .820			23 ^h 27 ^m 44 ^s .653					
+82° 10' 44'' .05			+86° 36' 51'' .19			+82° 13' 2'' .89			+86° 50' 19'' .16					

[Eph 15]

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	33 Piscium. Mag. 4.7		α Andromedæ. (Alpheratz.) Mag. 2.2		β Cassiopeiæ. Mag. 2.4		ϵ Phœnicis. Mag. 3.9	
	Right Ascension.	Declination S.	Right Ascension.	Declination N.	Right Ascension.	Declination N.	Right Ascension.	Declination S.
	h m o o	° ' " — 6 10	h m o 3	° ' " + 28 37	h m o 4	° ' " + 58 40	h m o 5	° ' " — 46 12
	s	"	s	"	s	"	s	"
Jan. 0.2	59.52	58.9	59.53	28.5	37.47	71.9	6.79	71.2
10.2	59.42 ¹⁰	59.4 ⁵	59.40 ¹³	27.6 ⁹	37.17 ³⁰	71.2 ⁷	6.60 ¹⁹	70.8 ⁴
20.2	59.33 ⁹	59.8 ⁴	59.28 ¹²	26.5 ¹¹	36.88 ²⁹	70.0 ¹²	6.42 ¹⁸	69.9 ⁹
30.1	59.25 ⁸	60.1 ³	59.17 ¹¹	25.2 ¹³	36.62 ²⁶	68.4 ¹⁶	6.26 ¹⁶	68.6 ¹³
Feb. 9.1	59.18 ⁷	60.3 ²	59.07 ¹⁰	23.7 ¹⁵	36.39 ²³	66.3 ²¹	6.14 ¹²	66.9 ¹⁷
	4	1	6	16	18	24	10	20
19.1	59.14	60.2	59.01	22.1	36.21	63.9	6.04	64.9
Mar. 1.1	59.12 ²	60.0 ²	58.97 ⁴	20.5 ¹⁶	36.09 ¹²	61.4 ²⁵	5.98 ⁶	62.5 ²⁴
11.0	59.13 ¹	59.5 ⁵	58.97 ⁰	19.0 ¹⁵	36.04 ⁵	58.7 ²⁷	5.97 ¹	59.8 ²⁷
21.0	59.18 ⁵	58.8 ⁷	59.01 ⁴	17.6 ¹⁴	36.07 ³	56.0 ²⁷	6.00 ³	56.9 ²⁹
31.0	59.26 ⁸	57.9 ⁹	59.10 ⁹	16.5 ¹¹	36.17 ¹⁰	53.5 ²⁵	6.08 ⁸	53.9 ³⁰
	13	12	13	9	19	23	13	32
Apr. 10.0	59.39	56.7	59.23	15.6	36.36	51.2	6.21	50.7
19.9	59.55 ¹⁶	55.3 ¹⁴	59.41 ¹⁸	15.0 ⁶	36.62 ²⁶	49.3 ¹⁹	6.39 ¹⁸	47.6 ³¹
29.9	59.75 ²⁰	53.7 ¹⁶	59.63 ²²	14.9 ¹	36.95 ³³	47.8 ¹⁵	6.62 ²³	44.4 ³²
May 9.9	59.98 ²³	51.9 ¹⁸	59.89 ²⁶	15.1 ²	37.34 ³⁹	46.7 ¹¹	6.90 ²⁸	41.3 ³¹
19.8	60.25 ²⁷	49.9 ²⁰	60.19 ³⁰	15.7 ⁶	37.79 ⁴⁵	46.1 ⁶	7.22 ³²	38.4 ²⁹
	29	20	32	10	48	1	36	26
29.8	60.54	47.9	60.51	16.7	38.27	46.0	7.58	35.8
June 8.8	60.85 ³¹	45.7 ²²	60.86 ³⁵	18.0 ¹³	38.78 ⁵¹	46.5 ⁵	7.96 ³⁸	33.4 ²⁴
18.8	61.17 ³²	43.6 ²¹	61.21 ³⁵	19.7 ¹⁷	39.31 ⁵³	47.5 ¹⁵	8.37 ⁴¹	31.3 ²¹
28.7	61.49 ³²	41.5 ²¹	61.56 ³⁵	21.6 ¹⁹	39.83 ⁵²	49.0 ¹⁵	8.78 ⁴¹	29.7 ¹⁶
July 8.7	61.81 ³²	39.5 ²⁰	61.91 ³⁵	23.8 ²²	40.34 ⁵¹	50.9 ¹⁹	9.19 ⁴¹	28.5 ¹²
	30	18	33	24	48	23	39	8
18.7	62.11	37.7	62.24	26.2	40.82	53.2	9.58	27.7
28.7	62.40 ²⁹	36.1 ¹⁶	62.54 ³⁰	28.7 ²⁵	41.26 ⁴⁴	55.9 ²⁷	9.95 ³⁷	27.5 ²
Aug. 7.6	62.65 ²⁵	34.7 ¹⁴	62.82 ²⁸	31.2 ²⁵	41.66 ⁴⁰	58.9 ³⁰	10.29 ³⁴	27.7 ²
17.6	62.88 ²³	33.5 ¹²	63.06 ²⁴	33.8 ²⁶	42.00 ³⁴	62.1 ³²	10.59 ³⁰	28.3 ⁶
27.6	63.07 ¹⁹	32.6 ⁹	63.26 ²⁰	36.3 ²⁵	42.29 ²⁹	65.5 ³⁴	10.83 ²⁴	29.4 ¹¹
	15	6	16	24	22	34	19	15
Sept. 6.5	63.22	32.0	63.42	38.7	42.51	68.9	11.02	30.9
16.5	63.33 ¹¹	31.6 ⁴	63.54 ¹²	41.0 ²³	42.67 ¹⁶	72.4 ³⁵	11.16 ¹⁴	32.7 ¹⁸
26.5	63.40 ⁷	31.5 ¹	63.62 ⁸	43.2 ²²	42.76 ⁹	75.8 ³⁴	11.24 ⁸	34.8 ²¹
Oct. 6.5	63.43 ³	31.7 ²	63.66 ⁴	45.1 ¹⁹	42.80 ⁴	79.1 ³³	11.26 ²	37.0 ²²
16.4	63.44 ¹	32.0 ³	63.66 ⁰	46.8 ¹⁷	42.77 ³	82.2 ³¹	11.23 ³	39.3 ²³
	3	5	2	14	8	28	8	23
26.4	63.41	32.5	63.64	48.2	42.69	85.0	11.15	41.6
Nov. 5.4	63.36 ⁵	33.1 ⁶	63.59 ⁵	49.3 ¹¹	42.55 ¹⁴	87.6 ²⁶	11.03 ¹²	43.7 ²¹
15.4	63.29 ⁷	33.8 ⁷	63.51 ⁸	50.2 ⁹	42.37 ¹⁸	89.7 ²¹	10.88 ¹⁵	45.6 ¹⁹
25.3	63.20 ⁹	34.5 ⁷	63.41 ¹⁰	50.7 ⁵	42.37 ²²	91.4 ¹⁷	10.70 ¹⁸	47.2 ¹⁶
Dec. 5.3	63.11 ⁹	35.3 ⁸	63.30 ¹¹	51.0 ³	42.15 ²⁵	92.7 ¹³	10.51 ¹⁹	48.5 ¹³
	10	7	12	1	28	7	21	8
15.3	63.01	36.0	63.18	50.9	41.62	93.4	10.30	49.3
25.2	62.90 ¹¹	36.7 ⁷	63.05 ¹³	50.5 ⁴	41.33 ²⁹	93.6 ²	10.09 ²¹	49.7 ⁴
35.2	62.80 ¹⁰	37.3 ⁶	62.92 ¹³	49.8 ⁷	41.03 ³⁰	93.3 ³	9.89 ²⁰	49.6 ¹
Sec δ , Tan δ	1.006	-0.108	1.139	+0.546	1.924	+1.644	1.445	-1.043
Mean Place	59°.112	59''.04	59°.450	16''.23	38°.056	51''.55	5°.987	59''.41
D δ α , D α α	0.00	+0.01	0.00	-0.04	0.00	-0.11	0.00	+0.07
D δ δ , D α δ	+0.4	0.0	+0.4	0.0	+0.4	0.0	+0.4	0.0

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	22 Andromedæ. Mag. 5.1		γ Pegasi. Mag. 2.9		σ Andromedæ. Mag. 4.5		ι Ceti. Mag. 3.8	
	Right Ascension.	Declination N.	Right Ascension.	Declination N.	Right Ascension.	Declination N.	Right Ascension.	Declination S.
	h m o 5	° ' " +45 35	h m o 8	° ' " +14 42	h m o 13	° ' " +36 18	h m o 15	° ' " - 9 17
Jan. 0.2	53.71 ¹⁹	74.7 8	51.69 ¹¹	47.6 8	53.05 ¹⁶	65.4 8	6.36 ¹¹	42.6 6
10.2	53.52 ¹⁹	73.9 12	51.58 ¹⁰	46.8 9	52.89 ¹⁵	64.6 11	6.25 ¹⁰	43.2 3
20.2	53.33 ¹⁷	72.7 16	51.48 ⁹	45.9 10	52.74 ¹³	63.5 14	6.15 ⁹	43.5 3
30.2	53.16 ¹⁴	71.1 19	51.39 ⁸	44.9 10	52.61 ¹²	62.1 16	6.06 ⁷	43.7 3
Feb. 9.1	53.02 ¹¹	69.2 21	51.31 ⁶	43.9 10	52.49 ⁹	60.5 18	5.99 ⁵	43.7 3
19.1	52.91 ⁷	67.1 22	51.25 ³	42.9 9	52.40 ⁶	58.7 19	5.94 ³	43.5 4
Mar. 1.1	52.84 ²	64.9 22	51.22 ⁰	42.0 7	52.34 ²	56.8 18	5.91 ¹	43.1 7
11.0	52.82 ³	62.7 22	51.22 ⁰	41.3 6	52.32 ²	55.0 17	5.90 ³	42.4 8
21.0	52.85 ⁹	60.5 20	51.26 ⁸	40.7 3	52.34 ⁸	53.3 16	5.93 ⁷	41.6 11
31.0	52.94 ¹⁵	58.5 17	51.34 ¹²	40.4 1	52.42 ¹³	51.7 13	6.00 ¹¹	40.5 14
Apr. 10.0	53.09 ²⁰	56.8 14	51.46 ¹⁶	40.3 2	52.55 ¹⁸	50.4 10	6.11 ¹⁴	39.1 16
19.9	53.29 ²⁷	55.4 10	51.62 ²⁰	40.5 5	52.73 ²³	49.4 6	6.25 ¹⁹	37.5 17
29.9	53.56 ³¹	54.4 6	51.82 ²⁴	41.0 9	52.96 ²⁷	48.8 2	6.44 ²²	35.8 19
May 9.9	53.87 ³⁵	53.8 4	52.06 ²⁷	41.9 11	53.23 ³¹	48.6 7	6.66 ²⁶	33.9 21
19.8	54.22 ³⁸	53.7 24	52.33 ³⁰	43.0 14	53.54 ³⁴	48.8 23	6.92 ²⁸	31.8 22
29.8	54.60 ⁴⁰	54.1 8	52.63 ³²	44.4 17	53.88 ³⁶	49.5 10	7.20 ³¹	29.6 21
June 8.8	55.00 ⁴²	54.9 13	52.95 ³³	46.1 19	54.24 ³⁷	50.5 14	7.51 ³²	27.5 21
18.8	55.42 ⁴¹	56.2 17	53.28 ³³	48.0 21	54.61 ³⁸	51.9 18	7.83 ³²	25.3 21
28.7	55.83 ⁴¹	57.9 21	53.61 ³³	50.1 21	54.99 ³⁷	53.7 21	8.15 ³²	23.2 20
July 8.7	56.24 ³⁸	60.0 24	53.93 ³¹	52.2 22	55.36 ³⁵	55.8 23	8.47 ³¹	21.2 17
18.7	56.62 ³⁶	62.4 27	54.24 ²⁹	54.4 22	55.71 ³³	58.1 26	8.78 ³⁰	19.5 14
28.7	56.98 ³²	65.1 29	54.53 ²⁷	56.6 22	56.04 ³⁰	60.7 26	9.08 ²⁶	17.9 11
Aug. 7.6	57.30 ²⁸	68.0 30	54.80 ²³	58.8 21	56.34 ²⁶	63.3 28	9.34 ²⁴	16.6 11
17.6	57.58 ²³	71.0 30	55.03 ¹⁹	60.9 19	56.60 ²³	66.1 27	9.58 ²⁰	15.5 14
27.6	57.81 ¹⁹	74.0 31	55.22 ¹⁶	62.8 17	56.83 ¹⁸	68.8 28	9.78 ¹⁶	14.8 14
Sept. 6.5	58.00 ¹³	77.1 31	55.38 ¹²	64.5 16	57.01 ¹³	71.6 26	9.94 ¹³	14.3 14
16.5	58.13 ⁹	80.2 29	55.50 ⁸	66.1 13	57.14 ¹⁰	74.2 25	10.07 ⁸	14.1 14
26.5	58.22 ⁴	83.1 28	55.58 ⁵	67.4 12	57.24 ⁵	76.7 23	10.15 ⁵	14.2 14
Oct. 6.5	58.26 ⁰	85.9 25	55.63 ¹	68.6 0	57.29 ¹	79.0 21	10.20 ²	14.6 14
16.4	58.26 ⁵	88.4 23	55.64 ¹	69.5 6	57.30 ²	81.1 19	10.22 ²	15.1 14
26.4	58.21 ⁸	90.7 20	55.63 ⁴	70.1 5	57.28 ⁵	83.0 16	10.20 ⁴	15.8 14
Nov. 5.4	58.13 ¹¹	92.7 17	55.59 ⁶	70.6 2	57.23 ⁸	84.6 12	10.16 ⁶	16.6 14
15.4	58.02 ¹⁴	94.4 12	55.53 ⁸	70.8 0	57.15 ¹⁰	85.8 10	10.10 ⁸	17.4 14
25.3	57.88 ¹⁶	95.6 8	55.45 ¹⁰	70.8 2	57.05 ¹²	86.8 5	10.02 ⁹	18.3 14
Dec. 5.3	57.72 ¹⁸	96.4 4	55.35 ¹⁰	70.6 4	56.93 ¹⁴	87.3 2	9.93 ¹⁰	19.2 14
15.3	57.54 ¹⁹	96.8 1	55.25 ¹¹	70.2 5	56.79 ¹⁵	87.5 2	9.83 ¹¹	20.0 14
25.2	57.35 ²⁰	96.7 5	55.14 ¹¹	69.7 8	56.64 ¹⁵	87.3 6	9.72 ¹⁰	20.7 14
35.2	57.15	96.2	55.03	68.9	56.49	86.7	9.62	21.3 14
Sec δ, Tan δ	1.429	+1.021	1.034	+0.263	1.241	+0.735	1.013	-0.16
Mean Place	53°.898	57°'.38	51°.420	39°'.81	52°.995	50°'.41	5°.845	42°'.12
D'ψ a, Dω a	0.00	-0.07	0.00	-0.02	0.00	-0.05	0.00	+0.01
Dψ δ, Dω δ	+0.4	0.0	+0.4	0.0	+0.4	+0.1	+0.4	+0.1

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	ζ Tucanæ. Mag. 4.3		44 Piscium. Mag. 6.0		β Hydri. Mag. 2.9		α Phœnicis. Mag. 2.4	
	Right Ascension.	Declination S.	Right Ascension.	Declination N.	Right Ascension.	Declination S.	Right Ascension.	Declination S.
	h m O 15	° ' " -65 21	h m O 21	° ' " + 1 28	h m O 21	° ' " -77 43	h m O 22	° ' " -42 45
Jan. 0.2	40.50 ^s	101.3 ^s	3.15 ^s	11.7 ^s	20.53 ^s	74.6 ^s	6.05 ^s	73.8 ^s
10.2	40.10 ⁴⁰	100.4 ⁹	3.04 ¹¹	11.1 ⁶	19.63 ⁹⁰	73.5 ¹¹	5.87 ¹⁸	73.7 ¹
20.2	39.73 ³⁷	99.0 ¹⁴	2.94 ¹⁰	10.5 ⁶	18.79 ⁸⁴	71.9 ¹⁶	5.70 ¹⁷	73.1 ⁶
30.2	39.39 ³⁴	97.1 ¹⁹	2.85 ⁹	10.0 ⁵	18.02 ⁷⁷	69.7 ²²	5.54 ¹⁶	72.1 ¹⁰
Feb. 9.1	39.11 ²⁸	94.7 ²⁴	2.78 ⁷	9.5 ⁵	17.36 ⁶⁶	67.0 ²⁷	5.40 ¹⁴	70.7 ¹⁴
	39.11 ²³	94.7 ²⁸	2.78 ⁶	9.5 ³	17.36 ⁵⁵	67.0 ³¹	5.40 ¹⁰	70.7 ¹⁸
19.1	38.88 ¹⁶	91.9 ³¹	2.72 ⁴	9.2 ²	16.81 ⁴²	63.9 ³⁴	5.30 ⁸	68.9 ²²
Mar. 1.1	38.72 ¹⁰	88.8 ³⁴	2.68 ¹	9.0 ⁰	16.39 ²⁷	60.5 ³⁷	5.22 ³	66.7 ²⁴
11.0	38.62 ¹	85.4 ³⁶	2.67 ³	9.0 ²	16.12 ¹²	56.8 ³⁸	5.19 ⁰	64.3 ²⁷
21.0	38.61 ⁶	81.8 ³⁷	2.70 ⁶	9.2 ⁴	16.00 ⁴	53.0 ³⁹	5.19 ⁶	61.6 ²⁹
31.0	38.67 ¹⁵	78.1 ³⁸	2.76 ¹⁰	9.6 ⁷	16.04 ¹⁹	49.1 ³⁹	5.25 ¹⁰	58.7 ³⁰
Apr. 10.0	38.82 ²²	74.3 ³⁷	2.86 ¹⁵	10.3 ¹⁰	16.23 ³⁴	45.2 ³⁸	5.35 ¹⁵	55.7 ³¹
19.9	39.04 ³¹	70.6 ³⁵	3.01 ¹⁸	11.3 ¹²	16.57 ⁵⁰	41.4 ³⁶	5.50 ²¹	52.6 ³²
29.9	39.35 ³⁸	67.1 ³⁴	3.19 ²²	12.5 ¹⁵	17.07 ⁶³	37.8 ³⁴	5.71 ²⁵	49.4 ³⁰
May 9.9	39.73 ⁴⁵	63.7 ³¹	3.41 ²⁶	14.0 ¹⁶	17.70 ⁷⁶	34.4 ³⁰	5.96 ²⁹	46.4 ³⁰
19.9	40.18 ⁵¹	60.6 ²⁸	3.67 ²⁸	15.6 ¹⁸	18.46 ⁸⁸	31.4 ²⁷	6.25 ³³	43.4 ²⁸
29.8	40.69 ⁵⁵	57.8 ²⁴	3.95 ³⁰	17.4 ²⁰	19.34 ⁹⁷	28.7 ²³	6.58 ³⁶	40.6 ²⁵
June 8.8	41.24 ⁵⁹	55.4 ¹⁹	4.25 ³²	19.4 ²¹	20.31 ¹⁰³	26.4 ¹⁷	6.94 ³⁸	38.1 ²²
18.8	41.83 ⁶¹	53.5 ¹⁵	4.57 ³²	21.5 ²¹	21.34 ¹⁰⁷	24.7 ¹²	7.32 ³⁹	35.9 ¹⁹
28.7	42.44 ⁵⁹	52.0 ⁹	4.89 ³²	23.6 ²⁰	22.41 ¹⁰⁹	23.5 ⁷	7.71 ³⁹	34.0 ¹⁴
July 8.7	43.05 ⁵⁹	51.1 ³	5.21 ³¹	25.6 ²⁰	23.50 ¹⁰⁷	22.8 ¹	8.10 ³⁸	32.6 ¹⁰
18.7	43.64 ⁵⁷	50.8 ²	5.52 ²⁹	27.6 ¹⁹	24.57 ¹⁰²	22.7 ⁵	8.48 ³⁶	31.6 ⁵
28.7	44.21 ⁵²	51.0 ⁷	5.81 ²⁷	29.5 ¹⁷	25.59 ⁹⁵	23.2 ¹¹	8.84 ³⁴	31.1 ⁴
Aug. 7.6	44.73 ⁴⁶	51.7 ¹³	6.08 ²³	31.2 ¹⁵	26.54 ⁸⁴	24.3 ¹⁶	9.18 ³⁰	31.0 ¹
17.6	45.19 ³⁸	53.0 ¹⁷	6.31 ²¹	32.7 ¹³	27.38 ⁷⁰	25.9 ²⁰	9.48 ²⁵	31.4 ⁹
27.6	45.57 ³⁰	54.7 ²¹	6.52 ¹⁶	34.0 ¹¹	28.08 ⁵⁵	27.9 ²⁵	9.73 ²¹	32.3 ¹³
Sept. 6.6	45.87 ²¹	56.8 ²⁵	6.68 ¹³	35.1 ⁸	28.63 ³⁸	30.4 ²⁷	9.94 ¹⁵	33.6 ¹⁶
16.5	46.08 ¹²	59.3 ²⁷	6.81 ¹⁰	35.9 ⁵	29.01 ¹⁹	33.1 ²⁹	10.09 ¹⁰	35.2 ¹⁹
26.5	46.20 ²	62.0 ²⁸	6.91 ⁵	36.4 ³	29.20 ⁰	36.0 ³¹	10.19 ⁴	37.1 ²¹
Oct. 6.5	46.22 ¹⁶	64.8 ²⁷	6.96 ¹	36.7 ¹	29.20 ³⁷	39.1 ²⁸	10.23 ⁵	39.2 ²²
16.4	46.15 ²⁴	67.6 ²⁵	6.99 ³	36.8 ²	29.02 ¹⁸	42.1 ²⁸	10.23 ⁵	41.4 ²³
26.4	45.99 ³⁰	70.3 ²¹	6.98 ⁵	36.7 ⁴	28.65 ⁶⁷	44.9 ²²	10.18 ¹²	43.7 ²⁰
Nov. 5.4	45.75 ³⁶	72.8 ¹⁸	6.95 ⁸	36.5 ⁶	28.13 ⁵²	47.5 ²⁶	10.09 ⁹	45.8 ²¹
15.4	45.45 ³⁹	74.9 ¹²	6.90 ⁷	36.1 ⁷	27.46 ⁷⁹	49.7 ¹⁷	9.97 ¹⁵	47.8 ¹⁷
25.3	45.09 ⁴¹	76.7 ⁷	6.83 ⁹	35.6 ⁷	26.67 ⁹²	51.4 ⁶	9.82 ¹⁸	49.5 ¹⁵
Dec. 5.3	44.70 ⁴¹	77.9 ⁵	6.75 ⁹	35.0 ⁶	25.80 ⁹²	52.6 ⁶	9.65 ¹⁸	51.0 ¹⁰
15.3	44.29 ⁴²	78.6 ¹	6.66 ¹⁰	34.3 ⁶	24.88 ⁹⁴	53.2 ¹	9.47 ¹⁹	52.0 ⁶
25.3	43.87 ⁴¹	78.7 ⁵	6.56 ¹¹	33.7 ⁷	23.94 ⁹³	53.1 ⁷	9.28 ¹⁹	52.6 ²
35.2	43.46 ⁴¹	78.2 ⁵	6.45 ¹¹	33.0 ⁷	23.01 ⁹³	52.4 ⁷	9.09 ¹⁹	52.8 ²
Star δ, Tan δ	2.400	-2.181	1.000	+0.026	4.706	-4.598	1.362	-0.925
Mean Place	39°.189	86''.29	2°.687	8''.31	28°.226	58''.65	5°.172	63''.30
Δα, Δα	0.00	+0.15	0.00	0.00	-0.01	+0.31	0.00	+0.06
Δδ, Δδ	+0.4	+0.1	+0.4	+0.1	+0.4	+0.1	+0.4	+0.1

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	12 Ceti. Mag. 6.0		13 Ceti. Mag. 5.2		ζ Cassiopeiæ. Mag. 3.7		π Andromedæ. Mag. 4.4	
	Right Ascension.	Declination S.	Right Ascension.	Declination S.	Right Ascension.	Declination N.	Right Ascension.	Declination N.
	h m 0 25	° ' " — 4 25	h m 0 30	° ' " — 4 3	h m 0 32	° ' " + 53 25	h m 0 32	° ' " + 33 15
	s	"	s	"	s	"	s	"
Jan. 0.2	42.60	35.0 6	52.90	36.3 6	13.65	65.6 4	20.46	20.4 6
10.2	42.50 ¹⁰	35.6 5	52.80 ¹⁰	36.9 5	13.40 ²⁵	65.2 9	20.32 ¹⁴	19.8 10
20.2	42.40 ¹⁰	36.1 5	52.70 ¹⁰	37.4 5	13.16 ²⁴	64.3 14	20.18 ¹⁴	18.8 12
30.2	42.31 ⁹	36.4 3	52.60 ¹⁰	37.7 3	12.92 ²⁴	62.9 17	20.04 ¹⁴	17.6 13
Feb. 9.1	42.23 ⁸	36.6 2	52.52 ⁸	38.0 3	12.71 ²¹	61.2 21	19.92 ¹²	16.2 14
	7	1	7	0	18		10	16
19.1	42.16	36.7 1	52.45	38.0 1	12.53	59.1 23	19.82	14.6 16
Mar. 1.1	42.12 ⁴	36.6 1	52.41 ⁴	37.9 1	12.40 ¹³	56.8 24	19.74	13.0 17
11.1	42.11 ¹	36.2 4	52.39 ²	37.6 3	12.32 ⁸	54.4 24	19.71 ³	11.3 16
21.0	42.13 ²	35.6 8	52.41 ⁵	37.1 8	12.31 ¹	52.0 24	19.72 ⁵	9.7 14
31.0	42.19 ¹⁰	34.8 10	52.46 ⁹	36.3 11	12.37 ¹²	49.6 21	19.77 ¹¹	8.3 12
Apr. 10.0	42.29 ¹³	33.8 13	52.55 ¹⁴	35.2 12	12.49 ¹⁹	47.5 19	19.88	7.1 8
19.9	42.42 ¹⁸	32.5 15	52.69 ¹⁷	34.0 15	12.68 ¹⁵	45.6 15	20.03 ¹⁵	6.3 6
29.9	42.60 ²²	31.0 17	52.86 ²¹	32.5 17	12.95 ²⁷	44.1 11	20.23 ²⁰	5.7 2
May 9.9	42.82 ²⁵	29.3 19	53.07 ²⁵	30.8 19	13.27 ³⁷	43.0 7	20.48 ²⁵	5.5 3
19.9	43.07 ²⁸	27.4 20	53.32 ²⁷	28.9 20	13.64 ⁴²	42.3 1	20.77 ³²	5.8 6
29.8	43.35 ³⁰	25.4 21	53.59 ³⁰	26.9 21	14.06 ⁴⁵	42.2 3	21.09 ³⁵	6.4 10
June 8.8	43.65 ³¹	23.3 22	53.89 ³²	24.8 21	14.51 ⁴⁷	42.5 8	21.44 ³⁶	7.4 13
18.8	43.96 ³²	21.1 21	54.21 ³²	22.7 21	14.98 ⁴⁸	43.3 13	21.80 ³⁷	8.7 17
28.8	44.28 ³²	19.0 20	54.53 ³²	20.6 20	15.46 ⁴⁷	44.6 21	22.17 ³⁷	10.4 20
July 8.7	44.60 ³¹	17.0 19	54.85 ³²	18.6 19	15.93 ⁴⁵	46.3 21	22.54 ³⁵	12.4 22
18.7	44.91 ³⁰	15.1 17	55.17 ²⁹	16.7 18	16.38 ⁴²	48.4 24	22.89 ³³	14.6 24
28.7	45.21 ²⁷	13.4 15	55.46 ²⁸	14.9 15	16.80 ³⁹	50.8 27	23.22 ³¹	17.0 24
Aug. 7.6	45.48 ²⁴	11.9 13	55.74 ²⁴	13.4 13	17.19 ³⁵	53.5 30	23.53 ²⁸	19.4 26
17.6	45.72 ²⁰	10.6 10	55.98 ²¹	12.1 10	17.54 ³⁰	56.5 31	23.81 ²³	22.0 26
27.6	45.92 ¹⁸	9.6 7	56.19 ¹⁸	11.1 8	17.84 ²⁵	59.6 32	24.04 ²⁰	24.6 25
Sept. 6.6	46.10 ¹³	8.9 5	56.37 ¹⁴	10.3 5	18.09 ²⁰	62.8 32	24.24 ¹⁶	27.1 25
16.5	46.23 ¹⁰	8.4 2	56.51 ¹⁰	9.8 2	18.29 ¹⁸	66.0 32	24.40 ¹¹	29.6 23
26.5	46.33 ⁶	8.2 1	56.61 ⁷	9.6 1	18.43 ¹⁴	69.2 31	24.51 ⁸	31.9 23
Oct. 6.5	46.39 ³	8.3 2	56.68 ³	9.7 2	18.51 ⁴	72.3 29	24.59 ⁴	34.1 20
16.5	46.42 ⁰	8.5 5	56.71 ¹	9.9 4	18.55 ²	75.2 28	24.63 ⁰	36.1 17
26.4	46.42	9.0 5	56.72	10.3 6	18.53 ⁶	78.0 24	24.63	37.8 15
Nov. 5.4	46.39 ⁵	9.5 7	56.69 ³	10.9 7	18.47 ¹¹	80.4 22	24.61 ⁶	39.3 13
15.4	46.34 ⁷	10.2 7	56.65 ⁷	11.6 7	18.36 ¹⁴	82.6 17	24.55 ⁸	40.5 8
25.3	46.27 ⁹	10.9 8	56.58 ⁸	12.3 8	18.22 ¹⁸	84.3 14	24.47 ¹⁰	41.3 6
Dec. 5.3	46.18 ⁹	11.7 8	56.50 ⁹	13.1 7	18.04 ²¹	85.7 8	24.37 ¹²	41.9 2
15.3	46.09 ¹⁰	12.5 7	56.41 ¹⁰	13.8 7	17.83 ²³	86.5 4	24.25 ¹⁴	42.1 1
25.3	45.99 ¹¹	13.2 6	56.31 ¹⁰	14.5 7	17.60 ²⁵	86.9 1	24.11 ¹⁴	42.0 5
35.2	45.88	13.8	56.21 ¹⁰	15.2 7	17.35	86.8	23.97 ¹⁴	41.5
Sec δ, Tan δ	1.003	-0.077	1.003	-0.071	1.679	+1.348	1.196	+0.656
Mean Place	42°.071	36''.49	52°.341	38''.03	13°.732	45''.39	20°.224	5''.76
D'ψ α, D _ω α	0.00	+0.01	0.00	0.00	0.00	-0.09	0.00	-0.04
D'ψ δ, D _ω δ	+0.4	+0.1	+0.4	+0.1	+0.4	+0.1	+0.4	+0.1

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	ε Andromedæ. Mag. 4.5		δ Andromedæ. Mag. 3.5		α Cassiopeiæ. (Schedir.) Var. 2.2-2.8		μ Phœnicis. Mag. 4.6	
	Right Ascension.	Declination N.	Right Ascension.	Declination N.	Right Ascension.	Declination N.	Right Ascension.	Declination S.
	h m o 34 s	° ' " + 28 51 "	h m o 34 s	° ' " + 30 23 "	h m o 35 s	° ' " + 56 4 "	h m o 37 s	° ' " - 46 32 "
Jan. 0.2	3.92	14.7	47.03	59.0	40.40	37.7	19.65	77.7
10.2	3.79 ¹³	14.0 ⁷	46.90 ¹³	58.3 ⁷	40.12 ²⁸	37.4 ³	19.44 ²¹	77.6 ¹
20.2	3.66 ¹³	13.1 ⁹	46.76 ¹⁴	57.4 ⁹	39.85 ²⁷	36.6 ⁸	19.23 ²¹	77.0 ⁶
30.2	3.53 ¹³	12.0 ¹¹	46.63 ¹³	56.3 ¹¹	39.59 ²⁶	35.2 ¹⁴	19.05 ¹⁸	76.0 ¹⁰
Feb. 9.1	3.42 ¹¹	10.7 ¹³	46.51 ¹²	54.9 ¹⁴	39.36 ²³	33.5 ¹⁷	18.88 ¹⁷	74.5 ¹⁵
	10 ¹⁰	15 ¹⁵	9 ⁹	15 ¹⁵	20 ²⁰	21 ²¹	14 ¹⁴	19 ¹⁹
19.1	3.32	9.2	46.42	53.4	39.16	31.4	18.74	72.6
Mar 1.1	3.25 ⁷	7.7 ¹⁵	46.35 ⁷	51.9 ¹⁵	39.01 ¹⁵	29.1 ²³	18.63 ¹¹	70.4 ²²
11.1	3.22 ³	6.3 ¹⁴	46.31 ⁴	50.3 ¹⁶	38.92 ⁹	26.7 ²⁴	18.56 ⁷	67.8 ²⁶
21.0	3.23 ¹	4.9 ¹⁴	46.32 ¹	48.9 ¹⁴	38.89 ³	24.2 ²⁵	18.54 ²	65.0 ³⁰
31.0	3.28 ⁵	3.7 ¹²	46.37 ⁵	47.7 ¹²	38.94 ⁵	21.7 ²⁵	18.57 ³	62.0 ²⁸
	10 ¹⁰	9 ⁹	10 ¹⁰	11 ¹¹	13 ¹³	22 ²²	8 ⁸	32 ³²
Apr. 10.0	3.38	2.8	46.47	46.6	39.07	19.5	18.65	58.8
19.9	3.53 ¹⁵	2.1 ⁷	46.62 ¹⁵	45.9 ⁷	39.27 ²⁰	17.5 ²⁰	18.78 ¹³	55.5 ³³
29.9	3.72 ¹⁹	1.8 ³	46.82 ²⁰	45.5 ⁴	39.54 ²⁷	15.8 ¹⁷	18.97 ¹⁹	52.2 ³³
May 9.9	3.96 ²⁴	1.8 ⁰	47.06 ²⁴	45.4 ¹	39.87 ³³	14.6 ¹²	19.21 ²⁴	49.0 ³²
19.9	4.24 ²⁸	2.2 ⁴	47.34 ²⁸	45.8 ⁴	40.26 ³⁹	13.8 ⁸	19.49 ²⁸	45.9 ³¹
	31 ³¹	8 ⁸	31 ³¹	7 ⁷	44 ⁴⁴	3 ³	33 ³³	29 ²⁹
29.8	4.55	3.0	47.65	46.5	40.70	13.5	19.82	43.0
June 8.8	4.88 ³³	4.2 ¹²	47.99 ³⁴	47.6 ¹¹	41.17 ⁴⁷	13.7 ²	20.18 ³⁶	40.3 ²⁷
18.8	5.23 ³⁵	5.6 ¹⁴	48.35 ³⁶	49.0 ¹⁴	41.66 ⁴⁹	14.4 ⁷	20.57 ³⁹	38.0 ²³
28.8	5.59 ³⁶	7.3 ¹⁷	48.71 ³⁶	50.7 ¹⁷	42.16 ⁵⁰	15.6 ¹²	20.97 ⁴⁰	36.0 ²⁰
July 8.7	5.94 ³⁵	9.3 ²⁰	49.07 ³⁶	52.6 ¹⁹	42.66 ⁵⁰	17.2 ¹⁶	21.38 ⁴¹	34.5 ¹⁵
	34 ³⁴	22 ²²	34 ³⁴	22 ²²	48 ⁴⁸	20 ²⁰	40 ⁴⁰	10 ¹⁰
18.7	6.28	11.5	49.41	54.8	43.14	19.2	21.78	33.5
28.7	6.61 ³³	13.8 ²³	49.74 ³³	57.2 ²⁴	43.59 ⁴⁵	21.6 ²⁴	22.17 ³⁹	32.9 ⁶
Aug. 7.6	6.90 ²⁹	16.2 ²⁴	50.04 ³⁰	59.6 ²⁴	44.00 ⁴¹	24.3 ²⁷	22.53 ³⁶	32.9 ⁰
17.6	7.17 ²⁷	18.7 ²⁵	50.31 ²⁷	62.1 ²⁵	44.38 ³⁸	27.2 ²⁹	22.85 ³²	33.3 ⁴
27.6	7.40 ²³	21.1 ²⁴	50.55 ²⁴	64.6 ²⁵	44.70 ³²	30.3 ³¹	23.13 ²⁸	34.2 ⁹
	20 ²⁰	23 ²³	20 ²⁰	24 ²⁴	26 ²⁶	33 ³³	23 ²³	14 ¹⁴
Sept. 6.6	7.60	23.4	50.75	67.0	44.96	33.6	23.36	35.6
16.5	7.75 ¹⁵	25.7 ²³	50.90 ¹⁵	69.3 ²³	45.17 ²¹	36.9 ³³	23.54 ¹⁸	37.3 ¹⁷
26.5	7.86 ¹¹	27.8 ²¹	51.02 ¹²	71.5 ²²	45.33 ¹⁶	40.1 ³²	23.66 ¹²	39.4 ²¹
Oct. 6.5	7.94 ⁸	29.7 ¹⁹	51.10 ⁸	73.5 ²⁰	45.42 ⁹	43.3 ³²	23.72 ⁶	41.6 ²²
16.5	7.98 ⁴	31.4 ¹⁷	51.14 ⁴	75.3 ¹⁸	45.46 ⁴	46.4 ³¹	23.73 ¹	44.0 ²⁴
	1 ¹	15 ¹⁵	1 ¹	15 ¹⁵	2 ²	29 ²⁹	4 ⁴	24 ²⁴
26.4	7.99	32.9	51.15	76.8	45.44	49.3	23.69	46.4
Nov. 5.4	7.97 ²	34.1 ¹²	51.13 ²	78.2 ¹⁴	45.38 ⁶	51.8 ²⁵	23.61 ⁸	48.8 ²⁴
15.4	7.92 ⁵	35.1 ¹⁰	51.08 ⁵	79.2 ¹⁰	45.26 ¹²	54.1 ²³	23.48 ¹³	51.0 ²²
25.3	7.85 ⁷	35.8 ⁷	51.00 ⁸	80.0 ⁸	45.10 ¹⁶	56.0 ¹⁹	23.32 ¹⁶	52.9 ¹⁹
Dec. 5.3	7.75 ¹⁰	36.1 ³	50.91 ⁹	80.4 ⁴	44.91 ¹⁹	57.4 ¹⁴	23.14 ¹⁸	54.5 ¹⁶
	11 ¹¹	1 ¹	11 ¹¹	2 ²	22 ²²	10 ¹⁰	20 ²⁰	11 ¹¹
15.3	7.64	36.2	50.80	80.6	44.69	58.4	22.94	55.6
25.3	7.52 ¹²	36.0 ²	50.67 ¹³	80.4 ²	44.44 ²⁵	58.9 ⁵	22.73 ²¹	56.3 ⁷
35.2	7.39 ¹³	35.5 ⁵	50.54 ¹³	79.9 ⁵	44.17 ²⁷	58.9 ⁰	22.52 ²¹	56.6 ³
Sec δ, Tan δ	1.142	+0.551	1.159	+0.587	1.792	+1.487	1.454	-1.056
Mean Place	3°.624	1°'.40	46°.744	45°'.13	40°.497	16°'.87	18°.605	66°'.68
Δα, Δδ	0.00	-0.04	0.00	-0.04	+0.01	-0.10	0.00	+0.07
Δδ, Δα	+0.4	+0.1	+0.4	+0.2	+0.4	+0.2	+0.4	+0.2

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	β Ceti. Mag. 2.2		θ Cassiopeiæ. Mag. 4.7		δ Cassiopeiæ. Mag. 5.6		ζ Andromedæ. Mag. 4.3	
	Right Ascension.	Declination S.	Right Ascension.	Declination N.	Right Ascension.	Declination N.	Right Ascension.	Declination N.
	h m 0 39	° ' " - 18 26	h m 0 39	° ' " + 47 49	h m 0 39	° ' " + 74 31	h m 0 42	° ' " + 23 48
	s	"	s	"	s	"	s	"
Jan. 0.3	20.14	73.4	59.07	28.8	59.78	49.4	50.21	29.8
10.2	20.03 ¹¹	73.8 ⁴	58.86 ²¹	28.5 ³	59.08 ⁷⁰	49.5 ¹	50.09 ¹²	29.2 ⁶
20.2	19.91 ¹²	74.0 ²	58.65 ²¹	27.6 ⁹	58.39 ⁶⁹	48.9 ⁶	49.96 ¹³	28.4 ⁸
30.2	19.80 ¹¹	73.9 ¹	58.45 ²⁰	26.3 ¹³	57.73 ⁶⁶	47.7 ¹²	49.84 ¹²	27.3 ¹¹
Feb. 9.1	19.70 ¹⁰	73.6 ³	58.27 ¹⁸	24.7 ¹⁶	57.12 ⁶¹	46.1 ¹⁶	49.73 ¹¹	26.2 ¹¹
	8	6	16	19	52	22	9	13
19.1	19.62	73.0	58.11	22.8	56.60	43.9	49.64	25.0
Mar. 1.1	19.57 ⁵	72.1 ⁹	57.99 ¹²	20.7 ²¹	56.20 ⁴⁰	41.4 ²⁵	49.57 ⁷	23.7 ¹³
11.1	19.53 ⁴	71.0 ¹¹	57.92 ⁷	18.5 ²²	55.92 ²⁸	38.7 ²⁷	49.53 ⁴	22.5 ¹²
21.0	19.54 ¹	69.6 ¹⁴	57.91 ¹	16.3 ²²	55.78 ¹⁴	35.7 ³⁰	49.53 ⁰	21.5 ¹⁰
31.0	19.58 ⁴	68.0 ¹⁶	57.95 ⁴	14.2 ²¹	55.80 ²	32.8 ²⁹	49.58 ⁵	20.6 ⁹
	8	19	11	19	18	28	9	7
Apr. 10.0	19.66	66.1	58.06	12.3	55.98	30.0	49.67	19.9
20.0	19.78 ¹²	64.1 ²⁰	58.23 ¹⁷	10.6 ¹⁷	56.31 ³³	27.3 ²⁷	49.80 ¹³	19.5 ⁴
29.9	19.95 ¹⁷	61.9 ²²	58.46 ²³	9.3 ¹³	56.78 ⁴⁷	25.0 ²³	49.98 ¹⁸	19.4 ¹
May 9.9	20.15 ²⁰	59.5 ²⁴	58.75 ²⁹	8.4 ⁹	57.38 ⁶⁰	23.1 ¹⁹	50.21 ²³	19.7 ³
19.9	20.39 ²⁴	57.1 ²⁴	59.08 ³³	7.9 ⁵	58.10 ⁷²	21.6 ¹⁵	50.47 ²⁶	20.3 ⁶
	28	24	38	0	80	10	29	9
29.8	20.67	54.7	59.46	7.9	58.90	20.6	50.76	21.2
June 8.8	20.97 ³⁰	52.3 ²⁴	59.87 ⁴¹	8.4 ⁵	59.77 ⁸⁷	20.2 ⁴	51.08 ³²	22.5 ¹³
18.8	21.29 ³²	50.0 ²³	60.29 ⁴²	9.2 ⁸	60.68 ⁹¹	20.3 ¹	51.42 ³⁴	24.0 ¹⁵
28.8	21.62 ³³	47.9 ²¹	60.73 ⁴⁴	10.5 ¹³	61.60 ⁹²	21.0 ⁷	51.76 ³⁴	25.8 ¹⁸
July 8.7	21.95 ³³	45.9 ²⁰	61.16 ⁴³	12.2 ¹⁷	62.52 ⁹²	22.2 ¹²	52.10 ³⁴	27.7 ¹⁹
	32	16	42	21	90	17	34	22
18.7	22.27 ³¹	44.3 ¹⁴	61.58 ³⁹	14.3 ²⁴	63.42 ⁸⁴	23.9 ²²	52.44 ³²	29.9 ²²
28.7	22.58 ³⁰	42.9 ¹⁴	61.97 ³⁹	16.7 ²⁶	64.26 ⁸⁴	26.1 ²²	52.76 ³²	32.1 ²²
Aug. 7.6	22.87 ²⁹	41.8 ¹¹	62.34 ³⁷	19.3 ²⁴	65.03 ⁷⁷	28.7 ²⁹	53.05 ²⁹	34.3 ²³
17.6	23.12 ²⁵	41.1 ⁷	62.67 ³³	22.1 ²⁸	65.72 ⁶⁹	31.6 ²⁹	53.32 ²⁷	36.6 ²³
27.6	23.35 ²³	40.7 ⁴	62.95 ²⁸	25.0 ²⁹	66.33 ⁶¹	34.8 ³²	53.55 ²³	38.8 ²²
	19	0	24	30	50	35	20	21
Sept. 6.6	23.54	40.7	63.19	28.0	66.83	38.3	53.75	40.9
16.5	23.69 ¹⁵	41.1 ⁴	63.38 ¹⁹	31.0 ³⁰	67.21 ³⁸	41.9 ³⁶	53.91 ¹⁶	42.9 ²⁰
26.5	23.80 ¹¹	41.7 ⁶	63.53 ¹⁵	34.0 ³⁰	67.48 ²⁷	45.6 ³⁷	54.03 ¹²	44.7 ¹⁸
Oct. 6.5	23.88	42.6	63.62	36.9	67.63 ¹⁵	49.3 ³⁷	54.12	46.3
16.5	23.91 ³	43.7 ¹¹	63.67 ⁵	39.6 ²⁷	67.66 ³	53.0 ³⁷	54.17	47.8
	0	12	1	25	9	35	2	12
26.4	23.91	44.9	63.68	42.1	67.57	56.5	54.19	49.0
Nov. 5.4	23.89 ²	46.2 ¹³	63.64 ⁴	44.3 ²²	67.37 ²⁰	59.8 ³³	54.18	49.9
15.4	23.83 ⁶	47.5 ¹³	63.56 ⁸	46.2 ¹⁹	67.06 ³¹	62.7 ²⁹	54.14	50.6
25.4	23.76 ⁷	48.8 ¹³	63.45 ¹¹	47.8 ¹⁶	66.64 ⁴²	65.3 ²²	54.08	51.1
Dec. 5.3	23.67 ⁹	50.0 ¹²	63.31 ¹⁴	49.0 ¹²	66.14 ⁵⁰	67.5 ²⁶	54.00	51.4
	11	10	17	7	59	16	10	1
15.3	23.56	51.0	63.14	49.7	65.55	69.1	53.90	51.3
25.3	23.45 ¹¹	51.8 ⁸	62.96 ¹⁸	50.0 ³	64.91 ⁶⁴	70.1 ¹⁰	53.79 ¹¹	51.1
35.2	23.33 ¹²	52.4 ⁶	62.75 ²¹	49.8 ²	64.23 ⁶⁸	70.6 ⁵	53.67 ¹²	50.6
Sec δ , Tan δ	1.054	-0.334	1.490	+1.104	3.749	+3.613	1.093	+0.441
Mean Place	19 ^h .419	70 ^m .44	58 ^h .953	9 ^m .82	60 ^h .695	25 ^m .22	49 ^h .797	17 ^m .90
D ψ α , D μ α	0.00	+0.02	+0.01	-0.07	+0.02	-0.24	0.00	-0.03
D ψ δ , D μ δ	+0.4	+0.2	+0.4	+0.2	+0.4	+0.2	+0.4	+0.2

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	η Cassiopeiæ. Mag. 3.6		δ Piscium. Mag. 4.6		λ Hydri. Mag. 5.0		20 Ceti. Mag. 4.9	
	Right Ascension.	Declination N.	Right Ascension.	Declination N.	Right Ascension.	Declination S.	Right Ascension.	Declination S.
	h m 0 43	° ' " + 57 21	h m 0 44	° ' " + 7 7	h m 0 45	° ' " - 75 22	h m 0 48	° ' " - 1 35
Jan. 0.3	56.94 ²⁸	78.5 ²	16.81 ¹¹	27.9 ⁷	41.52 ⁷⁹	84.0 ⁷	40.39 ¹⁰	76.5 ⁶
10.2	56.66 ²⁹	78.3 ²	16.70 ¹¹	27.2 ⁷	40.73 ⁷⁶	83.3 ¹³	40.29 ¹¹	77.1 ⁶
20.2	56.37 ²⁷	77.6 ⁷	16.59 ¹⁰	26.5 ⁷	39.97 ⁷¹	82.0 ¹⁸	40.18 ¹⁰	77.7 ⁴
30.2	56.10 ²⁵	76.3 ¹³	16.49 ⁹	25.8 ⁶	39.26 ⁶⁴	80.2 ²³	40.08 ⁸	78.1 ²
Feb. 9.1	55.85 ²¹	74.7 ²⁰	16.40 ⁸	25.2 ⁵	38.62 ⁵⁵	77.9 ²⁸	39.98 ⁸	78.5 ⁴
19.1	55.64 ¹⁷	72.7 ²³	16.32 ⁶	24.7 ⁵	38.07 ⁴⁵	75.1 ³²	39.90 ⁶	78.7 ⁰
Mar 1.1	55.47 ¹¹	70.4 ²⁵	16.26 ³	24.2 ³	37.62 ³³	71.9 ³⁴	39.84 ³	78.7 ²
11.1	55.36 ³	67.9 ²⁶	16.23 ⁰	23.9 ¹	37.29 ²²	68.5 ³⁷	39.81 ⁴	78.5 ⁴
21.0	55.33 ³	65.3 ²⁵	16.23 ⁴	23.8 ³	37.07 ⁹	64.8 ³⁸	39.80 ⁷	78.1 ⁶
31.0	55.36 ¹²	62.8 ²³	16.27 ⁸	23.9 ³	36.98 ⁵	61.0 ³⁹	39.84 ⁷	77.5 ⁹
Apr. 10.0	55.48 ¹⁹	60.5 ²¹	16.35 ¹³	24.2 ⁶	37.03 ¹⁹	57.1 ³⁸	39.91 ¹²	76.6 ¹¹
20.0	55.67 ²⁷	58.4 ¹⁸	16.48 ¹⁶	24.8 ⁸	37.22 ³¹	53.3 ³⁸	40.03 ¹⁶	75.5 ¹³
29.9	55.94 ³⁴	56.6 ¹³	16.64 ²¹	25.6 ¹²	37.53 ⁴⁴	49.5 ³⁵	40.19 ²⁰	74.2 ¹⁶
May 9.9	56.28 ⁴⁰	55.3 ⁹	16.85 ²⁴	26.8 ¹⁴	37.97 ⁵⁶	46.0 ³³	40.39 ²³	72.6 ¹⁷
19.9	56.68 ⁴⁴	54.4 ⁵	17.09 ²⁷	28.2 ¹⁵	38.53 ⁶⁷	42.7 ²⁹	40.62 ²⁶	70.9 ¹⁹
29.8	57.12 ⁴⁹	53.9 ¹	17.36 ³⁰	29.7 ¹⁸	39.20 ⁷⁶	39.8 ²⁶	40.88 ²⁹	69.0 ²⁰
June 8.8	57.61 ⁵¹	54.0 ⁵	17.66 ³²	31.5 ¹⁹	39.96 ⁸³	37.2 ²⁰	41.17 ³¹	67.0 ²¹
18.8	58.12 ⁵²	54.5 ¹¹	17.98 ³²	33.4 ²⁰	40.79 ⁸⁸	35.2 ¹⁶	41.48 ³²	64.9 ²¹
28.8	58.64 ⁵¹	55.6 ¹⁵	18.30 ³²	35.4 ²⁰	41.67 ⁹⁰	33.6 ¹⁰	41.80 ³²	62.8 ²¹
July 8.7	59.15 ⁵⁰	57.1 ¹⁹	18.62 ³²	37.4 ²¹	42.57 ⁹¹	32.6 ⁴	42.12 ³²	60.7 ¹⁹
18.7	59.65 ⁴⁸	59.0 ²²	18.94 ³⁰	39.5 ²⁰	43.48 ⁸⁸	32.2 ¹	42.44 ³⁰	58.8 ¹⁸
28.7	60.13 ⁴⁴	61.2 ²⁶	19.24 ²⁸	41.5 ¹⁸	44.36 ⁸³	32.3 ⁷	42.74 ²⁸	57.0 ¹⁶
Aug. 7.7	60.57 ⁴⁰	63.8 ²⁹	19.52 ²⁶	43.3 ¹⁷	45.19 ⁷⁶	33.0 ¹³	43.02 ²⁶	55.4 ¹⁴
17.6	60.97 ³⁴	66.7 ³¹	19.78 ²²	45.0 ¹⁶	45.95 ⁶⁵	34.3 ¹⁸	43.28 ²²	54.0 ¹²
27.6	61.31 ³⁰	69.8 ³¹	20.00 ¹⁹	46.6 ¹³	46.60 ⁵³	36.1 ²³	43.50 ¹⁹	52.8 ⁹
Sept. 6.6	61.61 ²³	72.9 ³³	20.19 ¹⁵	47.9 ¹¹	47.13 ³⁹	38.4 ²⁶	43.69 ¹⁶	51.9 ⁶
16.5	61.84 ¹⁸	76.2 ³³	20.34 ¹²	49.0 ⁹	47.52 ²⁴	41.0 ²⁸	43.85 ¹²	51.3 ⁴
26.5	62.02 ¹¹	79.5 ³²	20.46 ⁸	49.9 ⁶	47.76 ⁹	43.8 ³⁰	43.97 ⁸	50.9 ¹
Oct. 6.5	62.13 ⁶	82.7 ³¹	20.54 ⁵	50.5 ⁴	47.85 ⁸	46.8 ³¹	44.05 ⁵	50.8 ²
16.5	62.19 ⁰	85.8 ²⁹	20.59 ²	50.9 ²	47.77 ²³	49.9 ³⁰	44.10 ²	51.0 ³
26.4	62.19 ⁵	88.7 ²⁷	20.61 ¹	51.1 ¹	47.54 ³⁷	52.9 ²⁸	44.12 ⁰	51.3 ⁴
Nov. 5.4	62.14 ¹⁰	91.4 ²³	20.60 ³	51.2 ²	47.17 ⁵⁰	55.7 ²⁵	44.12 ³	51.7 ⁶
15.4	62.04 ¹⁵	93.7 ²⁰	20.57 ⁵	51.0 ³	46.67 ⁶¹	58.2 ²⁰	44.09 ⁵	52.3 ⁷
25.4	61.89 ¹⁹	95.7 ¹⁶	20.52 ⁷	50.7 ⁴	46.06 ⁷⁰	60.2 ¹⁵	44.04 ⁷	53.0 ⁷
Dec. 5.3	61.70 ²²	97.3 ¹¹	20.45 ⁹	50.3 ⁵	45.36 ⁷⁶	61.7 ¹⁰	43.97 ⁹	53.7 ⁷
15.3	61.48 ²⁵	98.4 ⁶	20.36 ¹⁰	49.8 ⁶	44.60 ⁷⁹	62.7 ⁴	43.88 ⁹	54.4 ⁸
25.3	61.23 ²⁸	99.0 ⁰	20.26 ¹⁰	49.2 ⁶	43.81 ⁸⁰	63.1 ³	43.79 ¹¹	55.2 ⁸
35.2	60.95	99.0	20.16 ¹⁰	48.6 ⁶	43.01	62.8 ³	43.68	55.8 ⁶
Dec. 8, Tan δ	1.855	+1.562	1.008	+0.125	3.963	-3.834	1.000	-0.028
Mean Place	56°.903	57°'.15	16°.251	21°'.73	39°.057	68°'.87	39°.747	79°'.65
P, α, D, δ	+0.01	-0.10	0.00	-0.01	-0.02	+0.26	0.00	0.00
δ, D, δ	+0.4	+0.2	+0.4	+0.2	+0.4	+0.2	+0.4	+0.2

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	γ Cassiopeiæ. Mag. 2.2		μ Andromedæ. Mag. 3.9		α Sculptoris. Mag. 4.4		ϵ Pisc Mag.
	Right Ascension.	Declination N.	Right Ascension.	Declination N.	Right Ascension.	Declination S.	Right Ascension.
	h m 0 51	° ' " +60 15	h m 0 52	° ' " +38 2	h m 0 54	° ' " -29 48	h m 0 58
Jan. 0.3	34.04	46.3	2.17	35.3	31.52	66.7	32.45
10.2	33.73 ³¹	46.3 ⁰	2.01 ¹⁶	34.9 ⁴	31.37 ¹⁵	67.1 ⁴	32.34 ¹¹
20.2	33.40 ³³	45.6 ⁷	1.85 ¹⁶	34.1 ⁸	31.23 ¹⁴	67.1 ⁰	32.23 ¹¹
30.2	33.09 ³¹	44.5 ¹¹	1.69 ¹⁶	33.0 ¹¹	31.09 ¹³	66.8 ³	32.12 ¹¹
Feb. 9.2	32.80 ²⁹	42.9 ¹⁰	1.54 ¹⁵	31.6 ¹⁴	30.96 ¹⁴	66.1 ⁷	32.02 ¹⁰
19.1	32.55 ²⁵	40.9 ²⁰	1.41 ¹³	30.0 ¹⁶	30.85 ¹¹	65.0 ¹¹	31.93 ⁹
Mar. 1.1	32.35 ²⁰	38.7 ²²	1.31 ¹⁰	28.3 ¹⁷	30.76 ⁹	63.6 ¹⁴	31.86 ⁷
11.1	32.21 ¹⁴	36.2 ²⁵	1.25 ⁶	26.5 ¹⁸	30.70 ⁶	61.9 ¹⁷	31.82 ⁴
21.0	32.14 ⁷	33.6 ²⁶	1.23 ²	24.7 ¹⁸	30.68 ²	59.9 ²⁰	31.81 ¹
31.0	32.16 ¹¹	31.1 ²⁵	1.26 ³	23.1 ¹⁶	30.70 ²	57.7 ²²	31.83 ²
Apr. 10.0	32.27 ¹⁹	28.6 ²²	1.35 ¹⁴	21.6 ¹²	30.76 ¹⁰	55.2 ²⁶	31.90 ¹¹
20.0	32.46 ²⁷	26.4 ¹⁹	1.49 ¹⁹	20.4 ⁸	30.86 ¹⁵	52.6 ²⁷	32.01 ¹⁵
29.9	32.73 ³⁴	24.5 ¹⁵	1.68 ²⁴	19.6 ⁶	31.01 ²⁰	49.9 ²⁸	32.16 ²⁰
May 9.9	33.07 ⁴¹	23.0 ¹¹	1.92 ²⁹	19.0 ¹	31.21 ²³	47.1 ²⁸	32.36 ²³
19.9	33.48 ⁴⁷	21.9 ⁷	2.21 ³³	18.9 ³	31.44 ²⁸	44.3 ²⁷	32.59 ²⁶
29.9	33.95 ⁵¹	21.2 ¹	2.54 ³⁵	19.2 ⁷	31.72 ³⁰	41.6 ²⁶	32.85 ²⁹
June 8.8	34.46 ⁵³	21.1 ⁴	2.89 ³⁷	19.9 ¹⁰	32.02 ³³	39.0 ²⁵	33.14 ³¹
18.8	34.99 ⁵⁵	21.5 ⁹	3.26 ³⁹	20.9 ¹⁴	32.35 ³⁴	36.5 ²²	33.45 ³²
28.8	35.54 ⁵⁵	22.4 ¹³	3.65 ³⁹	22.3 ¹⁸	32.69 ³⁵	34.3 ¹⁹	33.77 ³³
July 8.7	36.09 ⁵⁴	23.7 ¹⁸	4.04 ³⁷	24.1 ²⁰	33.04 ³⁴	32.4 ¹⁶	34.10 ³²
18.7	36.63 ⁵¹	25.5 ²²	4.41 ³⁶	26.1 ²³	33.38 ³³	30.8 ¹¹	34.42 ³⁰
28.7	37.14 ⁴⁸	27.7 ²⁶	4.77 ³⁴	28.4 ²⁴	33.71 ³¹	29.7 ⁸	34.72 ²⁹
Aug. 7.7	37.62 ⁴³	30.3 ²⁸	5.11 ³⁰	30.8 ²⁵	34.02 ²⁹	28.9 ³	35.01 ²⁶
17.6	38.05 ³⁸	33.1 ³⁰	5.41 ²⁷	33.3 ²⁶	34.31 ²⁵	28.6 ¹	35.27 ²⁴
27.6	38.43 ³²	36.1 ³²	5.68 ²³	35.9 ²⁷	34.56 ²¹	28.7 ⁵	35.51 ²⁰
Sept. 6.6	38.75 ²⁶	39.3 ³³	5.91 ¹⁹	38.6 ²⁶	34.77 ¹⁷	29.2 ⁹	35.71 ¹⁷
16.6	39.01 ²⁰	42.6 ³⁴	6.10 ¹⁴	41.2 ²⁵	34.94 ¹³	30.1 ¹³	35.88 ¹³
26.5	39.21 ¹⁴	46.0 ³³	6.24 ¹¹	43.7 ²⁴	35.07 ⁹	31.4 ¹⁵	36.01 ⁹
Oct. 6.5	39.35 ⁷	49.3 ³²	6.35 ⁷	46.1 ²²	35.16 ⁵	32.9 ¹⁷	36.10 ⁷
16.5	39.42 ¹	52.5 ³¹	6.42 ³	48.3 ²⁰	35.21 ⁰	34.6 ¹⁸	36.17 ³
26.4	39.43 ⁵	55.6 ²⁸	6.45 ¹	50.3 ¹⁸	35.21 ³	36.4 ¹⁹	36.20 ¹
Nov. 5.4	39.38 ¹¹	58.4 ²⁵	6.44 ⁴	52.1 ¹⁵	35.18 ⁵	38.3 ¹⁸	36.21 ²
15.4	39.27 ¹⁶	60.9 ²²	6.40 ⁷	53.6 ¹²	35.13 ⁹	40.1 ¹⁷	36.19 ⁵
25.4	39.11 ²¹	63.1 ¹⁸	6.33 ¹⁰	54.8 ⁸	35.04 ¹²	41.8 ¹⁵	36.14 ⁶
Dec. 5.3	38.90 ²⁵	64.9 ¹²	6.23 ¹²	55.6 ⁵	34.93 ¹²	43.3 ¹³	36.08 ⁸
15.3	38.65 ²⁸	66.1 ⁸	6.11 ¹⁴	56.1 ²	34.81 ¹⁴	44.6 ¹⁰	36.00 ⁹
25.3	38.37 ³¹	66.9 ³	5.97 ¹⁵	56.3 ³	34.67 ¹⁴	45.6 ⁶	35.91 ¹⁰
35.3	38.06	67.2	5.82	56.0	34.53	46.2	35.81
Sec δ , Tan δ	2.016	+1.750	1.270	+0.782	1.153	-0.573	1.008
Mean Place	34°.034	24''.17	1°.817	18''.68	30°.589	60''.63	31°.808
$D\psi a, D_{\omega} a$	+0.01	-0.11	0.00	-0.05	0.00	+0.04	0.00
$D\psi \delta, D_{\omega} \delta$	+0.4	+0.2	+0.4	+0.2	+0.4	+0.2	+0.4

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	β Phœnicis. Mag. 3.4			μ Cassiopeiæ. Mag. 5.3			η Ceti. Mag. 3.6			β Andromedæ. Mag. 2.4		
	Right Ascension.	Declination S.		Right Ascension.	Declination N.		Right Ascension.	Declination S.		Right Ascension.	Declination N.	
	h m I 2	° ' " -47 9		h m I 2	° ' " +54 30		h m I 4	° ' " -10 37		h m I 4	° ' " +35 10	
Jan. 0.3	18.68	"		36.53	"		19.63	"		58.55	"	
10.2	18.45 ²³	97.2 ²		36.29 ²⁴	35.3 ¹		19.52 ¹¹	57.1 ⁶		58.40 ¹⁵	28.3 ⁴	
20.2	18.23 ²²	96.8 ⁴		36.04 ²⁵	34.7 ⁶		19.41 ¹¹	57.6 ⁵		58.24 ¹⁶	27.6 ⁷	
30.2	18.02 ²¹	96.0 ⁸		35.79 ²⁵	33.6 ¹¹		19.29 ¹²	57.8 ²		58.09 ¹⁵	26.6 ¹⁰	
Feb. 9.2	17.82 ¹⁷	94.8 ¹²		35.56 ²³	32.1 ¹⁵		19.19 ¹⁰	57.9 ²		57.94 ¹⁵	25.4 ¹²	
19.1	17.65 ¹⁴	93.1 ²²		35.36 ¹⁷	30.3 ²¹		19.09 ⁷	57.7 ⁴		57.81 ¹⁰	23.9 ¹⁶	
Mar. 1.1	17.51 ¹¹	90.9 ²⁴		35.19 ¹¹	28.2 ²⁴		19.02 ⁵	57.3 ⁷		57.71 ⁷	22.3 ¹⁶	
11.1	17.40 ⁶	88.5 ²⁸		35.08 ⁵	25.8 ²⁴		18.97 ²	56.6 ⁹		57.64 ³	20.7 ¹⁶	
21.0	17.34 ¹	85.7 ³⁰		35.03 ²	23.4 ²⁴		18.95 ¹	55.7 ¹¹		57.61 ²	19.1 ¹⁵	
31.0	17.33 ⁴	82.7 ³²		35.05 ⁹	21.0 ²²		18.96 ⁶	54.6 ¹⁴		57.63 ⁷	17.6 ¹³	
Apr. 10.0	17.37 ⁹	79.5 ³³		35.14 ¹⁶	18.8 ²¹		19.02 ¹⁰	53.2 ¹⁶		57.70 ¹²	16.3 ¹¹	
20.0	17.46 ¹⁵	76.2 ³⁴		35.30 ²⁴	16.7 ¹⁸		19.12 ¹⁴	51.6 ¹⁸		57.82 ¹⁷	15.2 ⁸	
29.9	17.61 ²⁰	72.8 ³³		35.54 ³⁰	14.9 ¹⁴		19.26 ¹⁸	49.8 ²⁰		57.99 ²³	14.4 ⁴	
May 9.9	17.81 ²⁶	69.5 ³¹		35.84 ⁴¹	13.5 ¹⁰		19.44 ²²	47.8 ²¹		58.22 ²⁷	14.0 ¹	
19.9	18.07 ³⁰	66.3 ³¹		36.20 ⁴¹	12.5 ⁵		19.66 ²⁵	45.7 ²³		58.49 ³⁰	13.9 ³	
29.9	18.37 ³⁴	63.2 ²⁹		36.61 ⁴⁶	12.0 ¹		19.91 ²⁹	43.4 ²²		58.79 ³⁴	14.2 ⁷	
June 8.8	18.71 ³⁸	60.3 ²⁵		37.07 ⁴⁸	11.9 ⁴		20.20 ³⁰	41.2 ²²		59.13 ³⁶	14.9 ¹⁰	
18.8	19.09 ³⁹	57.8 ²¹		37.55 ⁴⁹	12.3 ⁹		20.50 ³²	39.0 ²²		59.49 ³⁷	15.9 ¹⁴	
28.8	19.48 ⁴⁰	55.7 ¹⁸		38.04 ⁵⁰	13.2 ¹²		20.82 ³²	36.8 ²¹		59.86 ³⁸	17.3 ¹⁶	
July 8.7	19.89 ⁴⁰	53.9 ¹²		38.54 ⁴⁹	14.4 ¹⁷		21.14 ³²	34.7 ¹⁸		60.24 ³⁷	18.9 ²⁰	
18.7	20.29 ⁴⁰	52.7 ⁸		39.03 ⁴⁷	16.1 ²¹		21.46 ³¹	32.9 ¹⁷		60.61 ³⁶	20.9 ²¹	
28.7	20.69 ³⁷	51.9 ³		39.50 ⁴⁴	18.2 ²⁴		21.77 ²⁹	31.2 ¹³		60.97 ³³	23.0 ²³	
Aug. 7.7	21.06 ³⁵	51.6 ³		39.94 ⁴¹	20.6 ²⁶		22.06 ²⁷	29.9 ¹¹		61.30 ³¹	25.3 ²⁴	
17.6	21.41 ³⁰	51.9 ⁷		40.35 ³⁶	23.2 ²⁸		22.33 ²⁴	28.8 ⁸		61.61 ²⁷	27.7 ²⁵	
27.6	21.71 ²⁶	52.6 ¹³		40.71 ³²	26.0 ³⁰		22.57 ²⁰	28.0 ⁴		61.88 ²⁴	30.2 ²⁴	
Sept. 6.6	21.97 ²¹	53.9 ¹⁷		41.03 ²⁶	29.0 ³¹		22.77 ¹⁷	27.6 ¹		62.12 ²⁰	32.6 ²⁴	
16.6	22.18 ¹⁵	55.6 ²⁰		41.29 ²¹	32.1 ³¹		22.94 ¹⁴	27.5 ¹		62.32 ¹⁶	35.0 ²⁴	
26.5	22.33 ¹⁰	57.6 ²³		41.50 ¹⁵	35.2 ³⁰		23.08 ¹⁰	27.6 ⁵		62.48 ¹²	37.4 ²²	
Oct. 6.5	22.43 ⁵	59.9 ²⁴		41.65 ¹⁰	38.2 ²⁸		23.18 ⁶	28.1 ⁸		62.60 ⁵	39.6 ²⁰	
16.5	22.48 ¹	62.3 ²⁶		41.75 ⁵	41.1 ²⁹		23.24 ⁴	28.8 ⁸		62.68 ⁵	41.6 ¹⁹	
26.4	22.47 ⁶	64.9 ²⁵		41.80 ⁰	43.9 ²⁶		23.28 ⁰	29.6 ¹⁰		62.73 ¹	43.5 ¹⁶	
Nov. 5.4	22.41 ¹⁰	67.4 ²⁴		41.80 ⁵	46.5 ²³		23.28 ⁰	30.6 ¹¹		62.74 ²	45.1 ¹⁴	
15.4	22.31 ¹⁴	69.8 ²¹		41.75 ¹⁰	48.8 ¹⁹		23.25 ⁷	31.7 ¹¹		62.72 ⁵	46.5 ¹¹	
25.4	22.17 ²⁰	71.9 ¹⁸		41.65 ¹³	50.7 ¹⁶		23.21 ⁴	32.8 ¹¹		62.67 ⁸	47.6 ⁸	
Dec. 5.3	22.00 ¹⁷	73.7 ¹⁵		41.52 ¹⁸	52.3 ¹²		23.14 ⁹	33.9 ¹⁰		62.59 ¹⁰	48.4 ⁵	
15.3	21.80 ²¹	75.2 ¹⁰		41.34 ²¹	53.5 ⁶		23.05 ⁹	34.9 ⁸		62.49 ¹³	48.9 ¹	
25.3	21.59 ²²	76.2 ⁵		41.13 ²³	54.1 ²		22.96 ¹¹	35.7 ⁸		62.36 ¹⁴	49.0 ²	
35.3	21.37	76.7 ⁵		40.90	54.3		22.85	36.5		62.22	48.8	
Sec δ , Tan δ	1.471	-1.079		1.722	+1.402		1.017	-0.188		1.223	+0.705	
Mean Place	17°.447	86''.62		36°.265	14''.24		18°.827	56''.92		58°.060	12''.60	
D ϕ α , D α α	-0.01	+0.07		+0.01	-0.09		0.00	+0.01		+0.01	-0.05	
D ϕ δ , D α δ	+0.4	+0.3		+0.4	+0.3		+0.4	+0.3		+0.4	+0.3	

APPARENT PLACES OF		FOR THE UPPER TRANSIT AT WASHINGTON.	
♈	Piscium.	♋	Tucanæ. Mag. 5.0
♉	♌	♍	Decid.

APPARENT PLACES OF $\delta 11$ FOR THE UPPER TRANSIT AT WASHINGTON.											
τ Piscium. Mag. 4.7			ζ Piscium. Mag. 5.6			κ Tucanæ. Mag. 5.0			f Piscium. Mag. 5.3		
Right Ascension.	Declina- tion N.		Right Ascension.	Declina- tion N.		Right Ascension.	Declina- tion S.		Right Ascension.	Declina- tion N.	
h m 1 6	+29 38		h m 1 9	+7 7		h m 1 12	-69 19		h m 1 13	+3 10	
0.3 59.04 13	33.6 4	18.04 11	41.0 6	55.45 55	53.1 1	25.56 10	7-2 7	48	53.0 7	25.46 11	6-5 6
10.2 58.91 14	32.5 10	17.82 11	40.4 7	54.90 54	52.3 13	25.35 11	5-9 6	47	51.0 19	25.24 11	5-3 4
20.2 58.77 14	31.5 11	17.71 10	39.7 6	53.85 48	49.1 23	25.13 10	4-9 4	47	46.8 28	25.03 8	4-5 3
30.2 58.63 13	30.4 13	17.61 10	38.5 6	53.37 44	52.93 37	24.95 6	4-2 1	47	44.0 31	24.89 3	4-1 1
Feb. 9.2 58.50 12	29.1 13	17.51 8	37.9 4	52.96 30	52.04 22	24.86 3	4-2 3	47	40.9 34	24.86 2	4-5 6
19.1 58.38 10	27.8 13	17.43 5	37.5 3	52.26 30	51.92 12	24.93 9	5-1 8	47	37.5 37	24.88 5	5-9 10
Mar. 1.1 58.28 7	26.4 14	17.38 2	37.2 1	51.89 7	51.96 17	25.02 13	6-9 13	47	30.1 38	25.02 13	8-2 14
11.1 58.21 2	25.0 12	17.36 1	37.2 1	51.96 7	52.13 27	25.15 18	9-6 17	47	26.3 38	25.33 22	11-3 19
21.1 58.19 1	23.8 10	17.37 6	37.5 3	51.96 7	52.40 36	25.55 25	13-3 19	47	18.8 35	25.55 25	15-1 21
31.0 58.20 7	22.8 8	17.43 10	38.0 8	52.13 27	52.76 44	25.80 28	17-1 23	47	15.3 32	25.80 28	19-1 25
Apr. 10.0 58.27 11	22.0 4	17.53 14	39.9 13	53.20 53	53.73 59	26.08 31	21-1 25	47	12.1 28	26.08 31	23-1 27
20.0 58.38 17	21.6 2	17.67 19	41.2 15	53.73 59	54.32 63	26.39 31	25-1 27	47	9.3 25	26.39 31	27-1 29
29.9 58.55 21	21.4 2	17.86 22	42.7 17	54.32 63	54.95 66	26.70 32	29-1 29	47	6.8 20	26.70 32	31-1 31
May 9.9 58.76 25	21.6 5	18.08 26	44.4 19	54.95 66	55.61 68	27.02 32	33-1 31	47	4.8 15	27.02 32	35-1 33
19.9 59.01 29	22.1 9	18.34 28	46.3 19	55.61 68	56.29 67	27.34 31	37-1 33	47	3.3 9	27.34 31	39-1 35
29.9 59.30 33	23.0 12	18.62 31	48.2 20	56.29 67	56.96 64	27.65 29	41-1 35	47	2.4 3	27.65 29	43-1 37
June 8.8 59.63 34	24.2 15	18.93 32	50.2 20	56.96 64	57.60 59	27.94 27	45-1 37	47	2.1 3	27.94 27	47-1 39
18.8 59.97 36	25.7 17	19.25 32	52.2 19	57.60 59	58.19 54	28.21 25	49-1 39	47	2.3 9	28.21 25	51-1 41
28.8 60.33 36	27.4 20	19.57 32	54.1 19	58.19 54	58.73 45	28.46 21	53-1 41	47	3.2 13	28.46 21	55-1 43
July 8.8 60.69 35	29.4 21	20.21 29	56.0 16	58.73 45	59.18 36	28.67 17	57-1 43	47	4.5 19	28.67 17	59-1 45
18.7 61.04 34	31.5 22	20.50 27	57.6 15	59.18 36	59.54 26	28.84 15	61-1 45	47	6.4 23	28.84 15	63-1 47
28.7 61.38 32	33.7 23	20.77 24	59.1 13	59.54 26	59.80 15	28.99 11	65-1 47	47	8.7 27	28.99 11	67-1 49
Aug. 7.7 61.70 30	36.0 23	21.01 21	60.4 11	59.80 15	59.99 7	29.10 8	69-1 49	47	11.4 29	29.10 8	71-1 51
17.6 62.00 26	38.3 22	21.22 18	61.5 8	59.99 7	60.3 2	29.18 5	73-1 51	47	14.3 31	29.18 5	75-1 53
27.6 62.26 23	40.5 22	21.40 14	62.3 6	60.3 2	60.9 4	29.23 1	77-1 53	47	17.4 30	29.23 1	79-1 55
Sept. 6.6 62.49 19	42.7 21	21.54 10	62.9 4	60.9 4	61.5 8	29.24 0	81-1 55	47	19.9 29	29.24 0	83-1 57
16.6 62.68 16	44.8 19	21.64 8	63.3 2	61.5 8	62.1 6	29.24 0	85-1 57	47	22.4 27	29.24 0	87-1 59
26.5 62.84 12	46.7 17	21.72 5	63.5 0	62.1 6	62.6 5	29.24 0	89-1 59	47	24.9 24	29.24 0	91-1 61
Oct. 6.5 62.96 8	48.4 15	21.77 1	63.5 0	62.6 5	63.0 3	29.24 0	93-1 61	47	27.4 21	29.24 0	95-1 63
16.5 63.04 5	49.9 13	21.77 1	63.5 0	63.0 3	63.3 2	29.24 0	97-1 63	47	29.9 19	29.24 0	99-1 65
26.5 63.09 1	51.2 11	21.77 3	63.5 0	63.3 2	63.6 4	29.24 0	101-1 65	47	32.4 15	29.24 0	103-1 67
Nov. 5.4 63.09 4	52.3 9	21.74 6	63.5 0	63.6 4	64.0 6	29.24 0	105-1 67	47	34.9 8	29.24 0	107-1 69
15.4 63.05 7	53.2 5	21.68 7	63.5 0	64.0 6	64.4 8	29.24 0	109-1 69	47	37.4 3	29.24 0	111-1 71
25.4 62.98 10	53.7 3	21.61 9	63.5 0	64.4 8	64.8 10	29.24 0	113-1 71	47	39.9 0	29.24 0	115-1 73
Dec. 5.3 62.88 11	54.0 0	21.52 10	63.5 0	64.8 10	65.2 12	29.24 0	117-1 73	47	42.4 0	29.24 0	119-1 75
15.3 62.77 12	54.0 3	21.42 10	63.5 0	65.2 12	65.6 14	29.24 0	121-1 75	47	44.9 0	29.24 0	123-1 77
25.3 62.65 12	53.7 3	21.32 10	63.5 0	65.6 14	66.0 16	29.24 0	125-1 77	47	47.4 0	29.24 0	127-1 79
25.3 62.65 12	53.7 3	21.22 10	63.5 0	66.0 16	66.4 18	29.24 0	129-1 79	47	49.9 0	29.24 0	131-1 81
			63.5 0	66.4 18	66.8 20	29.24 0	133-1 81	47	52.4 0	29.24 0	135-1 83
			63.5 0	66.8 20	67.2 22	29.24 0	137-1 83	47	54.9 0	29.24 0	139-1 85
			63.5 0	67.2 22	67.6 24	29.24 0	141-1 85	47	57.4 0	29.24 0	143-1 87
			63.5 0	67.6 24	68.0 26	29.24 0	145-1 87	47	59.9 0	29.24 0	147-1 89
			63.5 0	68.0 26	68.4 28	29.24 0	149-1 89	47	62.4 0	29.24 0	151-1 91
			63.5 0	68.4 28	68.8 30	29.24 0	153-1 91	47	64.9 0	29.24 0	155-1 93
			63.5 0	68.8 30	69.2 32	29.24 0	157-1 93	47	67.4 0	29.24 0	159-1 95
			63.5 0	69.2 32	69.6 34	29.24 0	161-1 95	47	69.9 0	29.24 0	163-1 97
			63.5 0	69.6 34	70.0 36	29.24 0	165-1 97	47	72.4 0	29.24 0	167-1 99
			63.5 0	70.0 36	70.4 38	29.24 0	169-1 99	47	74.9 0	29.24 0	171-1 101
			63.5 0	70.4 38	70.8 40	29.24 0	173-1 101	47	77.4 0	29.24 0	175-1 103
			63.5 0	70.8 40	71.2 42	29.24 0	177-1 103	47	79.9 0	29.24 0	179-1 105
			63.5 0	71.2 42	71.6 44	29.24 0	181-1 105	47	82.4 0	29.24 0	183-1 107
			63.5 0	71.6 44	72.0 46	29.24 0	185-1 107	47	84.9 0	29.24 0	187-1 109
			63.5 0	72.0 46	72.4 48	29.24 0	189-1 109	47	87.4 0	29.24 0	191-1 111
			63.5 0	72.4 48	72.8 50	29.24 0	193-1 111	47	89.9 0	29.24 0	195-1 113
			63.5 0	72.8 50	73.2 52	29.24 0	197-1 113	47	92.4 0	29.24 0	199-1 115
			63.5 0	73.2 52	73.6 54	29.24 0	201-1 115	47	94.9 0	29.24 0	203-1 117
			63.5 0	73.6 54	74.0 56	29.24 0	205-1 117	47	97.4 0	29.24 0	207-1 119
			63.5 0	74.0 56	74.4 58	29.24 0	209-1 119	47	99.9 0	29.24 0	211-1 121
			63.5 0	74.4 58	74.8 60	29.24 0	213-1 121	47	102.4 0	29.24 0	215-1 123
			63.5 0	74.8 60	75.2 62	29.24 0	217-1 123	47	104.9 0	29.24 0	219-1 125
			63.5 0	75.2 62	75.6 64	29.24 0	221-1 125	47	107.4 0	29.24 0	223-1 127
			63.5 0	75.6 64	76.0 66	29.24 0	225-1 127	47	109.9 0	29.24 0	227-1 129
			63.5 0	76.0 66	76.4 68	29.24 0	229-1 129	47	112.4 0	29.24 0	231-1 131
			63.5 0	76.4 68	76.8 70	29.24 0	233-1 131	47	114.9 0	29.24 0	235-1 133
			63.5 0	76.8 70	77.2 72	29.24 0	237-1 133	47	117.4 0	29.24 0	239-1 135
			63.5 0	77.2 72	77.6 74	29.24 0	241-1 135	47	119.9 0	29.24 0	243-1 137
			63.5 0	77.6 74	78.0 76	29.24 0	245-1 137	47	122.4 0	29.24 0	247-1 139
			63.5 0	78.0 76	78.4 78	29.24 0	249-1 139	47	124.9 0	29.24 0	251-1 141
			63.5 0	78.4 78	78.8 80	29.24 0	253-1 141	47	127.4 0	29.24 0	255-1 143
			63.5 0	78.8 80	79.2 82	29.24 0	257-1 143	47	129.9 0	29.24 0	259-1 145
			63.5 0	79.2 82	79.6 84	29.24 0	261-1 145	47	132.4 0	29.24 0	263-1 147
			63.5 0	79.6 84	80.0 86	29.24 0	265-1 147	47	134.9 0	29.24 0	267-1 149
			63.5 0	80.0 86	80.4 88	29.24 0	269-1 149	47	137.4 0	29.24 0	271-1 151
			63.5 0	80.4 88	80.8 90	29.24 0	273-1 151	47	139.9 0	29.24 0	275-1 153
			63.5 0	80.8 90	81.2 92	29.24 0	277-1 153	47	142.4 0	29.24 0	279-1 155
			63.5 0	81.2 92	81.6 94	29.24 0	281-1 155	47	144.9 0	29.24 0	283-1 157
			63.5 0	81.6 94	82.0 96	29.24 0	285-1 157	47	147.4 0	29.24 0	287-1 159
			63.5 0	82.0 96	82.4 98	29.24 0	289-1 159	47	149.9 0	29.24 0	291-1 161
			63.5 0	82.4 98	82.8 100	29.24 0	293-1 161	47	152.4 0	29.24 0	295-1 163
			63.5 0	82.8 100	83.2 102	29.24 0	297-1 163	47	154.9 0	29.24 0	299-1 165
			63.5 0	83.2 102	83.6 104	29.24 0	301-1 165	47	157.4 0	29.24 0	303-1 167
			63.5 0	83.6 104	84.0 106	29.24 0	305-1 167	47	159.9 0	29.24 0	307-1 169
			63.5 0	84.0 106	84.4 108	29.24 0	309-1 169	47	162.4 0	29.24 0	311-1 171
			63.5 0	84.4 108	84.8 110	29.24 0	313-1 171	47	164.9 0	29.24 0	315-1 173
			63.5 0	84.8 110	85.2 112	29.24 0	317-1 173	47	167.4 0	29.24 0	319-1 175
			63.5 0	85.2 112	85.6 114	29.24 0	321-1 175	47	169.9 0	29.24 0	323-1 177
			63.5 0	85.6 114	86.0 116	29.24 0	325-1 177	47	172.4 0	29.24 0	327-1 179
			63.5 0	86.0 116	86.4 118	29.24 0	329-1 179	47	174.9 0	29.24 0	331-1 181
			63.5 0	86.4 118	86.8 120	29.24 0	333-1 181	47	177.4 0	29.24 0	335-1 183
			63.5 0	86.8 120	87.2 122	29.24 0	337-1 183	47	179.9 0	29.24 0	339-1 185

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	♊ Piscium. Mag. 4.7		♋ Ceti. Mag. 3.8		♌ Cassiopeiæ. Mag. 2.8		♍ Phœnicis. Mag. 3.4	
	Right Ascension.	Declination N.	Right Ascension.	Declination S.	Right Ascension.	Declination N.	Right Ascension.	Declination S.
	h m I 14	° ' " +26 49	h m I 19	° ' " - 8 36	h m I 20	° ' " +59 47	h m I 24	° ' " -43 44
Jan. 0.3	48.06 ^s	17.0	47.32 ^s	76.4	15.08 ^s	61.2	41.81 ^s	81.9
10.3	47.93 ¹³	16.6 4	47.22 ¹⁰	77.1 7	14.78 ³⁰	61.5 3	41.61 ²⁰	82.4 5
20.2	47.80 ¹³	16.0 6	47.10 ¹²	77.6 5	14.47 ³¹	61.2 3	41.40 ²¹	82.4 0
30.2	47.66 ¹⁴	15.1 9	46.98 ¹²	77.9 3	14.15 ³²	60.4 8	41.19 ²¹	82.0 4
Feb. 9.2	47.53 ¹³	14.1 ¹⁰	46.87 ¹¹	78.1 2	13.84 ³¹	59.1 ¹³	40.99 ²⁰	81.0 ¹⁰
19.1	47.41 ¹²	12.9 ¹²	46.76 ¹¹	78.0 1	13.56 ²⁸	57.4 ¹⁷	40.81 ¹⁸	79.6 ¹⁴
Mar 1.1	47.31 ¹⁰	11.7 ¹²	46.68 8	77.7 3	13.33 ²³	55.4 ²⁰	40.65 ¹⁶	77.8 ¹⁸
11.1	47.24 7	10.5 ¹²	46.61 7	77.2 5	13.15 ¹⁸	53.1 ²³	40.53 ¹²	75.7 ²¹
21.1	47.21 3	9.3 ¹²	46.58 3	76.4 8	13.04 ¹¹	50.7 ²⁴	40.44 9	73.2 ²⁵
31.0	47.22 1	8.2 ¹¹	46.58 0	75.4 ¹⁰	13.01 3	48.2 ²⁵	40.40 4	70.4 ²⁸
Apr. 10.0	47.28 6	7.4 8	46.62 4	74.2 ¹²	13.06 5	45.7 ²⁵	40.41 1	67.4 ³⁰
20.0	47.38 ¹⁰	6.7 7	46.70 8	72.7 ¹⁵	13.20 ¹⁴	43.4 ²³	40.47 6	64.2 ³²
30.0	47.53 ¹⁵	6.4 3	46.82 ¹²	71.1 ¹⁶	13.42 ²²	41.4 ²⁰	40.58 ¹¹	60.9 ³³
May 9.9	47.73 ²⁰	6.3 1	46.99 ¹⁷	69.2 ¹⁹	13.72 ³⁰	39.7 ¹⁷	40.75 ¹⁷	57.6 ³³
19.9	47.98 ²⁵	6.6 3	47.20 ²¹	67.1 ²¹	14.09 ³⁷	38.4 ¹³	40.97 ²²	54.4 ³²
29.9	48.26 ²⁸	7.2 6	47.44 ²⁴	65.0 ²¹	14.52 ⁴³	37.5 9	41.24 ²⁷	51.2 ³²
June 8.8	48.57 ³¹	8.2 ¹⁰	47.72 ²⁸	62.8 ²²	15.01 ⁴⁹	37.1 4	41.55 ³¹	48.3 ²⁹
18.8	48.90 ³³	9.4 ¹²	48.01 ²⁹	60.6 ²²	15.53 ⁵²	37.1 0	41.89 ³⁴	45.6 ²⁷
28.8	49.25 ³⁵	10.9 ¹⁵	48.32 ³¹	58.5 ²¹	16.07 ⁵⁴	37.7 6	42.26 ³⁷	43.3 ²³
July 8.8	49.60 ³⁵	12.6 ¹⁷	48.64 ³²	56.4 ²¹	16.62 ⁵⁵	38.7 ¹⁰	42.64 ³⁸	41.3 ²⁰
18.7	49.95 ³⁵	14.5 ¹⁹	48.96 ³²	54.5 ¹⁹	17.17 ⁵⁵	40.1 ¹⁴	43.03 ³⁹	39.7 ¹⁶
28.7	50.29 ³⁴	16.6 ²¹	49.27 ³¹	52.8 ¹⁷	17.70 ⁵³	42.0 ¹⁹	43.41 ³⁸	38.7 ¹⁰
Aug. 7.7	50.61 ³²	18.7 ²¹	49.57 ³⁰	51.3 ¹⁵	18.20 ⁵⁰	44.2 ²²	43.78 ³⁷	38.1 6
17.7	50.90 ²⁹	20.9 ²²	49.84 ²⁷	50.2 ¹¹	18.67 ⁴⁷	46.7 ²⁵	44.12 ³⁴	38.1 0
27.6	51.17 ²⁷	23.1 ²²	50.09 ²⁵	49.3 9	19.09 ⁴²	49.5 ²⁸	44.43 ³¹	38.6 5
Sept. 6.6	51.40 ²³	25.2 ²¹	50.30 ²¹	48.7 6	19.47 ³⁸	52.5 ³⁰	44.70 ²⁷	39.6 ¹⁰
16.6	51.60 ²⁰	27.2 ²⁰	50.49 ¹⁹	48.5 2	19.78 ³¹	52.5 ³¹	44.92 ²²	39.6 ¹⁴
26.5	51.76 ¹⁶	29.1 ¹⁹	50.64 ¹⁵	48.6 1	20.04 ²⁶	55.6 ³²	45.10 ¹⁸	41.0 ¹⁸
Oct. 6.5	51.88 ¹²	30.8 ¹⁷	50.75 ¹¹	48.9 3	20.24 ²⁰	58.8 ³²	45.22 ¹²	42.8 ²²
16.5	51.97 9	32.4 ¹⁶	50.83 8	48.9 6	20.37 ¹³	62.0 ³²	45.22 8	45.0 ²²
26.5	52.03 6	33.8 ¹⁴	50.88 5	49.5 8	20.45 8	65.1 ³¹	45.30 3	47.3 ²⁵
Nov. 5.4	52.05 2	34.9 ¹¹	50.90 2	50.3 9	20.45 1	68.2 ³¹	45.33 2	49.8 ²⁵
15.4	52.05 0	35.9 ¹⁰	50.90 1	51.2 ⁹	20.46 1	71.1 ²⁹	45.31 2	52.3 ²⁵
25.4	52.01 4	36.6 7	50.89 1	52.2 ¹⁰	20.42 4	73.7 ²⁶	45.24 7	54.8 ²⁵
Dec. 5.4	52.01 6	37.0 4	50.86 3	53.3 ¹¹	20.31 ¹¹	76.0 ²³	45.14 ¹⁰	57.1 ²³
15.3	51.87 8	37.0 2	50.80 6	54.4 ¹¹	20.15 ¹⁶	78.0 ²⁰	45.00 ¹⁴	59.1 ²⁰
25.3	51.77 ¹⁰	37.2 0	50.73 ¹⁰	55.4 9	19.95 ²⁰	79.5 ¹⁵	44.84 ¹⁶	60.7 ¹⁶
35.3	51.65 ¹²	36.9 3	50.63 ¹⁰	56.3 8	19.70 ²⁵	80.6 ¹¹	44.65 ¹⁹	62.0 ¹³
	51.65 ¹²	36.9 3	50.53 ¹⁰	57.1 8	19.42 ²⁸	81.1 5	44.45 ²⁰	62.8 8
Star, Tan δ	1.121	+0.506	1.011	-0.152	1.988	+1.718	1.384	-0.957
Place	47° 43'	3' 41"	46° 49'	77' 93"	14° 64'	38' 69"	40° 49'	73' 17"
Star, D. α	0.00	-0.03	0.00	+0.01	+0.02	-0.11	-0.01	+0.06
Star, D. δ	+0.4	+0.3	+0.4	+0.3	+0.4	+0.3	+0.4	+0.4

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	38 Cassiopeiae. Mag. 6.0		7 Piscium. Mag. 3.7		40 Cassiopeiae. Mag. 5.5		v Andromedæ. Mag. 4.2	
	Right Ascension.	Declination N.	Right Ascension.	Declination N.	Right Ascension.	Declination N.	Right Ascension.	Declination N.
	h m I 24	° ' " +69 49	h m I 26	° ' " +14 54	h m I 31	° ' " +72 36	h m I 31	° ' " +40 58
Jan. 0.3	53.38	64.0	56.70	38.7	42.37	51.5	48.81	68.8
10.3	52.90 ⁴⁸	64.5 ⁵	56.59 ¹¹	38.2 ⁵	41.80 ⁵⁷	52.2 ⁷	48.65 ¹⁶	68.8 ⁰
20.2	52.39 ⁵¹	64.5 ⁰	56.47 ¹²	37.6 ⁶	41.20 ⁶⁰	52.3 ¹	48.48 ¹⁷	68.4 ⁴
30.2	51.88 ⁵¹	63.9 ⁶	56.35 ¹²	36.9 ⁷	40.59 ⁶¹	51.8 ⁵	48.29 ¹⁹	67.6 ⁸
Feb. 9.2	51.39 ⁴⁵	62.7 ¹²	56.23 ¹¹	36.1 ⁸	40.00 ⁵⁹	50.7 ¹¹	48.11 ¹⁸	66.5 ¹¹
19.1	50.94	61.0	56.12	35.3	39.46	49.1	47.95	65.1
Mar. 1.1	50.55	58.9	56.02 ¹⁰	34.6 ⁷	38.99 ⁴⁷	47.1 ²⁰	47.80 ¹⁵	63.5
11.1	50.25 ³⁰	56.5 ²⁴	55.95 ⁷	33.9 ⁷	38.62 ³⁷	44.7 ²⁴	47.69 ¹¹	61.8
21.1	50.05 ²⁰	53.9 ²⁶	55.91 ⁴	33.4 ⁵	38.36 ²⁶	42.1 ²⁶	47.63 ⁶	60.0
31.0	49.97 ⁸	51.1 ²⁸	55.91 ⁰	33.0 ⁴	38.23 ¹³	39.3 ²⁸	47.61 ²	58.3
Apr. 10.0	50.00	48.4	55.95	32.8	38.24	36.5	47.64	56.7
20.0	50.16 ¹⁶	45.8 ²⁶	56.04 ⁹	32.9 ¹	38.39 ¹⁵	33.7 ²⁸	47.74 ¹⁰	55.2
30.0	50.44 ²⁸	43.3 ²⁵	56.17 ¹³	33.2 ³	38.68 ²⁹	31.2 ²⁵	47.89 ¹⁵	54.0
May 9.9	50.83 ³⁹	41.2 ²¹	56.34 ¹⁷	33.8 ⁶	39.10 ⁴²	28.9 ²³	48.10 ²¹	53.1
19.9	51.32 ⁴⁹	39.4 ¹⁸	56.56 ²²	34.7 ⁹	39.64 ⁵⁴	27.0 ¹⁹	48.36 ²⁶	52.6
29.9	51.90 ⁵⁸	38.1 ¹³	56.81 ²⁵	35.8 ¹¹	40.28 ⁶⁴	25.6 ¹⁴	48.67 ³¹	52.4
June 8.8	52.56 ⁶⁶	37.3 ⁸	57.10 ²⁹	37.1 ¹³	41.01 ⁷³	24.6 ¹⁰	49.01 ³⁴	52.6
18.8	53.26 ⁷⁰	37.0 ³	57.41 ³¹	38.7 ¹⁶	41.80 ⁷⁹	24.1 ⁵	49.38 ³⁷	53.2
28.8	54.00 ⁷⁴	37.2 ²	57.73 ³²	40.4 ¹⁷	42.63 ⁸³	24.1 ⁵	49.77 ³⁹	54.1
July 8.8	54.76 ⁷⁵	37.8 ⁶	58.06 ³³	42.2 ¹⁸	43.49 ⁸⁶	24.6 ⁵	50.17 ⁴⁰	55.4
18.7	55.51	39.0	58.39	44.1	44.35	25.7	50.57	57.0
28.7	56.25 ⁷⁴	40.7 ¹⁷	58.71 ³²	46.1 ²⁰	45.19 ⁸⁴	27.2 ¹⁵	50.96 ³⁹	58.9
Aug. 7.7	56.95 ⁷⁰	42.8 ²¹	59.02 ³¹	48.0 ¹⁹	45.99 ⁸⁰	29.1 ¹⁹	51.33 ³⁷	61.0
17.7	57.60 ⁶⁵	45.2 ²⁴	59.30 ²⁸	49.8 ¹⁸	46.74 ⁷⁵	31.5 ²⁴	51.67 ³⁴	63.3
27.6	58.19 ⁵⁹	48.0 ²⁸	59.56 ²⁶	51.5 ¹⁷	47.43 ⁶⁹	34.2 ²⁷	51.99 ³²	65.6
Sept. 6.6	58.71 ⁵²	51.0 ³⁰	59.79 ²³	53.1 ¹⁶	48.04 ⁶¹	37.2 ³⁰	52.27 ²⁸	68.1
16.6	59.16 ⁴⁵	54.3 ³³	59.98 ¹⁹	54.6 ¹⁵	48.57 ⁵³	40.4 ³²	52.52 ²⁵	70.6
26.5	59.52 ³⁶	57.7 ³⁴	60.14 ¹⁶	55.8 ¹²	49.00 ⁴³	43.8 ³⁴	52.72 ²⁰	73.1
Oct. 6.5	59.79 ²⁷	61.2 ³⁵	60.28 ¹⁴	56.8 ¹⁰	49.33 ³³	47.3 ³⁵	52.89 ¹⁷	75.5
16.5	59.98 ¹⁹	64.7 ³⁵	60.38 ¹⁰	57.7 ⁹	49.56 ²³	50.9 ³⁶	53.01 ¹²	77.8
26.5	60.08 ¹⁰	68.1 ³⁴	60.44 ⁶	58.3 ⁶	49.68 ¹²	54.4 ³⁵	53.09 ⁸	79.9
Nov. 5.4	60.08 ⁰	71.3 ³²	60.48 ⁴	58.8 ⁵	49.69 ¹	57.7 ³³	53.14 ⁵	81.9
15.4	59.99 ⁹	74.4 ³¹	60.49 ¹	59.0 ²	49.60 ⁹	60.9 ³²	53.14 ⁰	83.6
25.4	59.81 ¹⁸	77.1 ²⁷	60.47 ²	59.1 ¹	49.40 ²⁰	63.8 ²⁹	53.11 ³	85.1
Dec. 5.4	59.54 ²⁷	79.5 ²⁴	60.42 ⁵	59.1 ⁰	49.10 ³⁰	66.3 ²⁵	53.05 ⁶	86.3
15.3	59.20 ³⁴	81.5 ²⁰	60.36 ⁶	58.9 ²	48.71 ³⁹	68.4 ²¹	52.95 ¹⁰	87.1
25.3	58.79 ⁴¹	82.9 ¹⁴	60.28 ⁸	58.5 ⁴	48.23 ⁴⁸	70.0 ¹⁶	52.83 ¹²	87.6
35.3	58.34 ⁴⁵	83.8 ⁹	60.17 ¹¹	58.0 ⁵	47.69 ⁵⁴	71.1 ¹¹	52.68 ¹⁵	87.8
Sec δ, Tan δ	2.901	+2.723	1.035	+0.266	3.346	+3.194	1.325	+0.869
Mean Place	52°.980	39''.72	55°.924	28''.83	41°.838	26''.78	48°.127	50''.71
D' δ a, D δ a	+0.03	-0.18	0.00	-0.02	+0.03	-0.20	+0.01	-0.05
D' δ, D δ	+0.4	+0.4	+0.4	+0.4	+0.4	+0.4	+0.4	+0.4

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	π Piscium. Mag. 5.6		υ Persei. Mag. 3.8		α Eridani. (Achernar.) Mag. 0.6		ω Cassiopeiæ. Mag. 5.5	
	Right Ascension.	Declination N.	Right Ascension.	Declination N.	Right Ascension.	Declination S.	Right Ascension.	Declination N.
	h m I 32	° ' " + 11 42	h m I 32	° ' " + 48 11	h m I 34	° ' " - 57 39	h m I 35	° ' " + 67 36
Jan. 0.3	36.22 ^s	34.3 ["]	46.69 ^s	72.7 ["]	34.74 ^s	77.5 ["]	62.25 ^s	73.2 ["]
10.3	36.12 ¹⁰	33.8 ⁵	46.49 ²⁰	72.8 ¹	34.42 ³²	77.9 ⁴	61.84 ⁴¹	73.8 ⁶
20.2	36.00 ¹²	33.1 ⁷	46.28 ²¹	72.5 ³	34.09 ³³	77.7 ²	61.39 ⁴⁵	73.9 ¹
30.2	35.88 ¹²	32.5 ⁶	46.06 ²²	71.7 ⁸	33.76 ³³	77.0 ⁷	60.93 ⁴⁶	73.4 ⁵
Feb. 9.2	35.76 ¹²	31.8 ⁷	45.85 ²¹	70.6 ¹¹	33.45 ³¹	75.8 ¹²	60.49 ⁴⁴	72.3 ¹¹
19.2	35.65 ¹¹	31.2 ⁶	45.65 ²⁰	69.2 ¹⁴	33.16 ²⁹	74.0 ¹⁸	60.08 ⁴¹	70.8 ¹⁵
Mar. 1.1	35.55 ¹⁰	30.6 ⁶	45.48 ¹⁷	67.4 ¹⁸	32.91 ²⁵	71.8 ²²	59.72 ³⁶	68.8 ²⁰
11.1	35.48 ⁷	30.1 ⁵	45.34 ¹⁴	65.5 ¹⁹	32.70 ²¹	69.2 ²⁶	59.43 ²⁹	66.5 ²³
21.1	35.44 ⁴	29.7 ⁴	45.26 ⁸	63.5 ²⁰	32.53 ¹⁷	66.2 ³⁰	59.23 ²⁰	64.0 ²⁵
31.0	35.43 ¹	29.5 ²	45.23 ³	61.4 ²¹	32.43 ¹⁰	63.0 ³²	59.13 ¹⁰	61.3 ²⁷
Apr. 10.0	35.46 ³	29.6 ¹	45.26 ³	59.5 ¹⁹	32.39 ⁴	59.5 ³⁵	59.14 ¹	58.6 ²⁷
20.0	35.54 ⁸	29.8 ²	45.36 ¹⁰	57.7 ¹⁸	32.42 ³	55.9 ³⁶	59.26 ¹²	56.0 ²⁶
30.0	35.66 ¹²	30.3 ⁵	45.53 ¹⁷	56.1 ¹⁶	32.52 ¹⁰	52.3 ³⁶	59.49 ²³	53.6 ²⁴
May 9.9	35.83 ¹⁷	31.0 ⁷	45.76 ²³	54.8 ¹³	32.69 ¹⁷	48.7 ³⁶	59.83 ³⁴	51.5 ²¹
19.9	36.04 ²¹	32.0 ¹⁰	46.04 ²⁸	53.9 ⁹	32.93 ²⁴	45.2 ³⁵	60.27 ⁴⁴	49.8 ¹⁷
29.9	36.28 ²⁴	33.3 ¹³	46.38 ³⁴	53.4 ⁵	33.23 ³⁰	41.8 ³⁴	60.79 ⁵²	48.4 ¹⁴
June 8.9	36.56 ²⁸	34.7 ¹⁴	46.76 ³⁸	53.3 ¹	33.59 ³⁶	38.7 ³¹	61.37 ⁵⁸	47.6 ⁸
18.8	36.86 ³⁰	36.3 ¹⁶	47.17 ⁴¹	53.6 ³	33.99 ⁴⁰	36.0 ²⁷	62.01 ⁶⁴	47.2 ⁴
28.8	37.18 ³²	38.1 ¹⁸	47.60 ⁴³	54.4 ⁸	34.43 ⁴⁴	33.6 ²⁴	62.69 ⁶⁸	47.3 ¹
July 8.8	37.50 ³²	40.0 ¹⁹	48.04 ⁴⁴	55.5 ¹¹	34.90 ⁴⁷	31.7 ¹⁹	63.39 ⁷⁰	47.9 ⁶
18.7	37.83 ³³	41.9 ¹⁹	48.48 ⁴⁴	57.0 ¹⁵	35.38 ⁴⁸	30.4 ¹³	64.08 ⁶⁹	49.0 ¹¹
28.7	38.15 ³²	43.8 ¹⁹	48.91 ⁴³	58.8 ¹⁸	35.86 ⁴⁸	29.5 ⁹	64.77 ⁶⁹	50.5 ¹⁵
Aug. 7.7	38.45 ³⁰	45.6 ¹⁸	49.32 ⁴¹	60.9 ²¹	36.32 ⁴⁶	29.2 ³	65.42 ⁶⁵	52.5 ²⁰
17.7	38.74 ²⁹	47.4 ¹⁸	49.70 ³⁸	63.2 ²³	36.75 ⁴³	29.5 ³	66.04 ⁶²	54.8 ²³
27.6	39.00 ²⁶	49.0 ¹⁶	50.05 ³⁵	65.7 ²⁵	37.15 ⁴⁰	30.4 ⁹	66.60 ⁵⁶	57.4 ²⁶
Sept. 6.6	39.23 ²³	50.4 ¹⁴	50.36 ³¹	68.4 ²⁷	37.50 ³⁵	31.8 ¹⁴	67.11 ⁵¹	59.4 ³⁰
16.6	39.43 ²⁰	51.7 ¹³	50.64 ²⁸	71.1 ²⁷	37.79 ²⁹	33.6 ¹⁸	67.54 ⁴³	60.4 ³¹
26.6	39.59 ¹⁶	52.8 ¹¹	50.86 ²²	73.9 ²⁸	38.02 ²³	35.9 ²³	67.90 ³⁶	63.5 ³³
Oct. 6.5	39.73 ¹⁴	53.6 ⁸	51.04 ¹⁸	76.6 ²⁷	38.18 ¹⁶	38.5 ²⁶	68.19 ²⁹	66.8 ³³
16.5	39.83 ¹⁰	54.2 ⁶	51.18 ¹⁴	79.2 ²⁶	38.27 ⁹	41.3 ²⁸	68.40 ²¹	70.2 ³⁴
26.5	39.90 ⁷	54.7 ⁵	51.27 ⁹	81.8 ²⁶	38.29 ²	44.2 ²⁹	68.52 ¹²	73.5 ³⁴
Nov. 5.4	39.94 ⁴	54.9 ²	51.31 ⁴	84.1 ²³	38.29 ⁵	47.1 ²⁹	68.56 ⁴	76.9 ³²
15.4	39.96 ²	55.0 ¹	51.31 ⁰	86.2 ²¹	38.12 ¹²	49.9 ²⁸	68.51 ⁵	80.1 ³⁰
25.4	39.94 ²	54.9 ¹	51.27 ⁴	88.1 ¹⁹	37.95 ¹⁷	52.5 ²⁶	68.39 ¹²	83.1 ²⁷
Dec. 5.4	39.90 ⁶	54.7 ³	51.19 ¹²	89.6 ¹²	37.73 ²⁶	54.7 ¹⁸	68.19 ²⁰	85.8 ²⁴
15.3	39.84 ⁸	54.4 ⁵	51.07 ¹⁵	90.8 ⁸	37.47 ²⁹	56.5 ¹³	67.91 ³⁴	88.2 ¹⁹
25.3	39.76 ¹⁰	53.9 ⁵	50.92 ¹⁸	91.6 ³	37.18 ³²	57.8 ⁸	67.57 ⁴⁰	90.1 ¹⁵
35.3	39.66 ¹⁰	53.4 ⁵	50.74 ¹⁸	91.9 ³	36.86 ³²	58.6 ⁸	67.17 ⁴⁰	91.6 ¹⁰
Star, Tan δ	1.021	+0.207	1.500	+1.119	1.869	-1.580	2.626	+2.428
Mean Place	35°.397	25''.42	46°.020	52''.66	32°.979	66''.31	61°.604	49''.20
$\Delta\alpha$, D ₀ α	0.00	-0.01	+0.01	-0.07	-0.02	+0.10	+0.03	-0.15
$\Delta\delta$, D ₀ δ	+0.4	+0.4	+0.4	+0.4	+0.4	+0.4	+0.4	+0.4

300 APPARENT PLACES OF STARS, 1915.

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	♈ Piscium. Mag. 4.7		♊ Persel. Mag. 4.2		♋ Ceti. Mag. 3.6		♌ Piscis. Mag. 4.	
	Right Ascension.	Declination N.	Right Ascension.	Declination N.	Right Ascension.	Declination S.	Right Ascension.	Declination S.
	h m I 37	° ' " + 5 3	h m I 38	° ' " + 50 15	h m I 40	° ' " - 16 22	h m I 40	° ' " +
Jan. 0.3	1.27 ^s	35.1 ["]	20.19 ^s	60.3 ["]	8.17 ^s	65.3 ["]	55.08 ^s	5 ["]
10.3	1.16 ¹¹	34.5 ⁶	19.99 ²⁰	60.5 ²	8.05 ¹²	66.1 ⁸	54.97 ¹¹	5 ["]
20.2	1.05 ¹¹	33.9 ⁶	19.77 ²²	60.2 ³	7.92 ¹³	66.6 ⁵	54.86 ¹¹	5 ["]
30.2	0.93 ¹²	33.3 ⁶	19.53 ²⁴	59.6 ⁶	7.79 ¹³	66.8 ²	54.74 ¹²	5 ["]
Feb. 9.2	0.81 ¹²	32.8 ⁵	19.30 ²³	58.5 ¹¹	7.65 ¹⁴	66.8 ⁰	54.62 ¹²	5 ["]
19.2	0.70 ¹¹	32.3 ⁵	19.09 ²¹	57.1 ¹⁴	7.52 ¹³	66.5 ³	54.50 ¹²	5 ["]
Mar. 1.1	0.60 ¹⁰	32.0 ³	18.90 ¹⁹	55.4 ¹⁷	7.41 ¹¹	65.9 ⁶	54.40 ¹⁰	5 ["]
11.1	0.53 ⁷	31.8 ²	18.75 ¹⁵	53.4 ²⁰	7.32 ⁹	65.0 ⁹	54.32 ⁸	5 ["]
21.1	0.48 ⁵	31.8 ⁰	18.65 ¹⁰	51.3 ²¹	7.26 ⁶	63.8 ¹²	54.27 ⁵	5 ["]
31.0	0.47 ¹	32.0 ²	18.61 ⁴	49.2 ²¹	7.23 ³	62.4 ¹⁴	54.26 ¹	5 ["]
Apr. 10.0	0.50 ³	32.4 ⁴	18.64 ³	47.2 ²⁰	7.24 ¹	60.7 ¹⁷	54.28 ²	5 ["]
20.0	0.57 ⁷	33.1 ⁷	18.73 ⁹	45.3 ¹⁹	7.30 ⁶	58.8 ¹⁹	54.35 ⁷	5 ["]
30.0	0.68 ¹¹	33.9 ⁸	18.89 ¹⁶	43.6 ¹⁷	7.40 ¹⁰	56.7 ²¹	54.47 ¹²	5 ["]
May 9.9	0.84 ¹⁶	35.1 ¹²	19.12 ²³	42.2 ¹⁴	7.54 ¹⁴	54.4 ²³	54.62 ¹⁵	5 ["]
19.9	1.04 ²⁰	36.4 ¹³	19.41 ²⁹	41.2 ¹⁰	7.72 ¹⁸	52.1 ²³	54.82 ²⁰	5 ["]
29.9	1.28 ²⁴	37.9 ¹⁵	19.75 ³⁴	40.5 ⁷	7.95 ²³	49.6 ²⁵	55.06 ²⁴	5 ["]
June 8.9	1.55 ²⁷	39.6 ¹⁷	20.14 ³⁹	40.3 ²	8.21 ²⁶	47.1 ²⁵	55.33 ²⁷	5 ["]
18.8	1.84 ²⁹	41.4 ¹⁸	20.56 ⁴²	40.5 ²	8.49 ²⁸	44.7 ²⁴	55.62 ²⁹	6 ["]
28.8	2.15 ³¹	43.3 ¹⁹	21.00 ⁴⁴	41.1 ⁶	8.79 ³⁰	42.4 ²³	55.93 ³¹	6 ["]
July 8.8	2.47 ³²	45.3 ²⁰	21.46 ⁴⁶	42.1 ¹⁰	9.11 ³²	40.2 ²²	56.26 ³²	6 ["]
18.7	2.79 ³¹	47.2 ¹⁸	21.91 ⁴⁵	43.5 ¹⁴	9.43 ³²	38.3 ¹⁷	56.58 ³²	6 ["]
28.7	3.10 ³⁰	49.0 ¹⁸	22.36 ⁴³	45.2 ²¹	9.75 ³⁰	36.6 ¹⁴	56.90 ³⁰	6 ["]
Aug. 7.7	3.40 ²⁸	50.8 ¹⁶	22.79 ⁴⁰	47.3 ²³	10.05 ²⁸	35.2 ¹⁰	57.20 ²⁹	7 ["]
17.7	3.68 ²⁶	52.4 ¹⁴	23.19 ³⁷	49.6 ²⁵	10.33 ²⁶	34.2 ⁶	57.49 ²⁶	7 ["]
27.6	3.94 ²³	53.8 ¹¹	23.56 ³³	52.1 ²⁶	10.59 ²⁴	33.6 ³	57.75 ²⁴	7 ["]
Sept. 6.6	4.17 ²⁰	54.9 ⁹	23.89 ²⁹	54.7 ²⁸	10.83 ²⁰	33.3 ¹	57.99 ²⁰	7 ["]
16.6	4.37 ¹⁷	55.8 ⁷	24.18 ²⁴	57.5 ²⁸	11.03 ¹⁶	33.4 ⁵	58.19 ¹⁷	7 ["]
26.6	4.54 ¹⁴	56.5 ⁵	24.42 ¹⁹	60.3 ²⁷	11.19 ¹³	33.9 ⁸	58.36 ¹⁵	7 ["]
Oct. 6.5	4.68 ¹⁰	57.0 ²	24.61 ¹⁵	63.0 ²⁶	11.32 ¹⁰	34.7 ¹²	58.51 ¹¹	7 ["]
16.5	4.78 ⁷	57.2 ⁰	24.76 ¹⁰	65.8 ²⁶	11.42 ⁶	35.7 ¹²	58.62 ⁷	7 ["]
26.5	4.85 ⁴	57.2 ²	24.86 ⁵	68.4 ²⁴	11.48 ³	36.9 ¹⁴	58.69 ⁵	7 ["]
Nov. 5.4	4.89 ²	57.0 ³	24.91 ¹	70.8 ²³	11.51 ⁰	38.3 ¹⁴	58.74 ²	7 ["]
15.4	4.91 ¹	56.7 ⁴	24.92 ³	73.1 ¹⁹	11.51 ⁶	39.7 ¹⁵	58.76 ¹	7 ["]
25.4	4.90 ⁴	56.3 ⁵	24.89 ⁹	75.0 ¹⁷	11.48 ⁶	41.2 ¹⁴	58.75 ³	7 ["]
Dec. 5.4	4.86 ⁶	55.8 ⁶	24.80 ¹²	76.7 ¹³	11.42 ⁷	42.6 ¹³	58.72 ⁵	7 ["]
15.3	4.80 ⁸	55.2 ⁶	24.68 ¹⁶	78.0 ⁹	11.35 ¹⁰	43.9 ¹¹	58.67 ⁸	7 ["]
25.3	4.72 ⁹	54.6 ⁷	24.52 ¹⁹	78.9 ⁵	11.25 ¹²	45.0 ⁹	58.59 ⁹	7 ["]
35.3	4.63 ⁹	53.9 ⁷	24.33 ¹⁹	79.4 ⁵	11.13 ¹²	45.9 ⁹	58.50 ⁹	7 ["]
Sec δ, Tan δ	1.004	+0.089	1.564	+1.203	1.042	-0.294	1.012	
Mean Place	0°.378	28''.40	19°.473	39''.68	7°.122	64''.87	54°.186	4
D'ψ α, Dω α	0.00	-0.01	+0.01	-0.07	0.00	+0.02	0.00	
Dψ δ, Dω δ	+0.4	+0.4	+0.4	+0.4	+0.4	+0.4	+0.4	

[Eph 13]

FOR THE UPPER TRANSIT AT WASHINGTON.

Star	ε Sculptoris. Mag. 5.4		ζ Ceti. Mag. 3.9		α Trianguli. Mag. 3.6		ε Cassiopeiæ. Mag. 3.4	
	Right Ascension.	Declina- tion S.	Right Ascension.	Declina- tion S.	Right Ascension.	Declina- tion N.	Right Ascension.	Declina- tion N.
	h m I 41	° ' " -25 28	h m I 47	° ' " -10 44	h m I 48	° ' " +29 9	h m I 48	° ' " +63 15
	s 40.83	" 40.2	s 16.91	" 74.6	s 14.78	" 69.7	s 16.77	" 30.8
0.3	40.70 ¹³	41.0 ⁸	16.80 ¹¹	75.4 ⁸	14.66 ¹²	69.5 ²	16.45 ³²	31.5 ⁷
0.2	40.55 ¹⁵	41.4 ⁴	16.68 ¹²	75.9 ⁵	14.52 ¹⁴	69.1 ⁴	16.09 ³⁶	31.6 ¹
0.2	40.40 ¹⁵	41.5 ¹	16.55 ¹³	76.3 ⁴	14.37 ¹⁵	68.4 ⁷	15.72 ³⁷	31.2 ⁴
0.2	40.25 ¹⁴	41.2 ³	16.42 ¹³	76.5 ²	14.22 ¹⁵	67.5 ⁹	15.35 ³⁷	30.3 ⁹
		5		1		10		14
0.2	40.11 ¹²	40.7 ¹⁰	16.30 ¹¹	76.4 ³	14.08 ¹³	66.5 ¹²	15.00 ³¹	28.9 ¹⁸
0.1	39.99 ¹⁰	39.7 ¹³	16.19 ⁹	76.1 ⁶	13.95 ¹⁰	65.3 ¹²	14.69 ²⁵	27.1 ²²
0.1	39.89 ⁷	38.4 ¹⁶	16.10 ⁶	75.5 ⁸	13.85 ⁶	64.1 ¹²	14.44 ¹⁸	24.9 ²³
0.1	39.82 ⁴	36.8 ¹⁹	16.04 ³	74.7 ¹¹	13.79 ³	62.9 ¹¹	14.26 ¹⁰	22.6 ²⁵
0.1	39.78 ¹	34.9 ²¹	16.01 ²	73.6 ¹³	13.76 ²	61.8 ¹⁰	14.16 ⁰	20.1 ²⁶
0.0	39.79 ⁵	32.8 ²³	16.03 ⁵	72.3 ¹⁵	13.78 ⁷	60.8 ⁹	14.16 ⁸	17.5 ²⁴
0.0	39.84 ¹⁰	30.5 ²⁶	16.08 ¹⁰	70.8 ¹⁸	13.85 ¹²	59.9 ⁶	14.24 ¹⁹	15.1 ²³
0.0	39.94 ¹⁴	27.9 ²⁶	16.18 ¹⁴	69.0 ²⁰	13.97 ¹⁷	59.3 ³	14.43 ²⁸	12.8 ²⁰
0.9	40.08 ¹⁹	25.3 ²⁷	16.32 ¹⁸	67.0 ²¹	14.14 ²²	59.0 ⁰	14.71 ³⁶	10.8 ¹⁷
0.9	40.27 ²³	22.6 ²⁸	16.50 ²²	64.9 ²²	14.36 ²⁶	59.0 ³	15.07 ⁴³	9.1 ¹³
0.9	40.50 ²⁶	19.8 ²⁷	16.72 ²⁶	62.7 ²²	14.62 ³⁰	59.3 ⁶	15.50 ⁵⁰	7.8 ⁹
0.9	40.76 ³⁰	17.1 ²⁶	16.98 ²⁸	60.5 ²³	14.92 ³²	59.9 ⁹	16.00 ⁵⁵	6.9 ⁴
0.8	41.06 ³¹	14.5 ²⁴	17.26 ³²	58.2 ²²	15.24 ³⁴	60.8 ¹²	16.55 ⁵⁸	6.5 ⁶
0.8	41.37 ³³	12.1 ²²	17.56 ³⁰	56.0 ²¹	15.58 ³⁶	62.0 ¹⁴	17.13 ⁶¹	6.6 ¹⁰
0.8	41.70 ³⁴	9.9 ¹⁹	17.88 ³²	53.9 ²⁰	15.94 ³⁶	63.4 ¹⁷	17.74 ⁶¹	7.2 ¹⁰
0.8	42.04 ³³	8.0 ¹⁵	18.20 ³¹	51.9 ¹⁷	16.30 ³⁵	65.1 ¹⁸	18.35 ⁶⁰	8.2 ¹⁵
0.7	42.37 ³¹	6.5 ¹¹	18.51 ³⁰	50.2 ¹⁵	16.65 ³²	66.9 ¹⁹	18.95 ⁵⁸	9.7 ¹⁸
0.7	42.68 ³⁰	5.4 ⁷	18.81 ²⁹	48.7 ¹¹	16.99 ³⁴	68.8 ²⁰	19.53 ⁵⁵	11.5 ²²
0.6	42.98 ²⁸	4.7 ³	19.10 ²⁷	47.6 ⁹	17.31 ³⁰	70.8 ²⁰	20.08 ⁵⁰	13.7 ²⁵
0.6	43.26 ²⁴	4.4 ²	19.37 ²³	46.7 ⁴	17.61 ²⁶	72.8 ²⁰	20.58 ⁴⁶	16.2 ²⁷
0.6	43.50 ²¹	4.6 ⁵	19.60 ²¹	46.3 ²	17.87 ²⁴	74.8 ²⁰	21.04 ⁴¹	18.9 ³⁰
0.6	43.71 ¹⁸	5.1 ⁹	19.81 ¹⁷	46.1 ²	18.11 ²⁰	76.8 ¹⁸	21.45 ³⁴	21.9 ³¹
0.5	43.89 ¹³	6.0 ¹³	19.98 ¹⁴	46.3 ⁴	18.31 ¹⁷	78.6 ¹⁸	21.79 ²⁸	25.0 ³²
0.5	44.02 ¹⁰	7.3 ¹⁵	20.12 ¹¹	46.7 ⁸	18.48 ¹³	80.4 ¹⁵	22.07 ²¹	28.2 ³²
0.5	44.12 ⁷	8.8 ¹⁸	20.23 ⁸	47.5 ⁹	18.61 ⁹	82.0 ¹⁵	22.28 ¹⁴	31.4 ³¹
0.5	44.19 ²	10.6 ¹⁸	20.31 ⁴	48.4 ¹¹	18.70 ⁷	83.5 ¹³	22.42 ⁸	34.5 ³¹
0.5	44.21 ¹	12.4 ¹⁹	20.35 ¹	49.5 ¹²	18.77 ³	84.8 ¹⁰	22.50 ⁰	37.6 ²⁸
0.4	44.20 ³	14.3 ¹⁷	20.36 ¹	50.7 ¹³	18.80 ⁰	85.8 ⁷	22.50 ¹³	40.4 ²⁶
0.4	44.17 ⁷	16.2 ¹⁹	20.35 ⁴	52.0 ¹²	18.80 ⁶	86.7 ⁴	22.43 ²⁰	43.0 ²³
0.4	44.10 ⁹	17.9 ¹⁵	20.31 ⁶	53.2 ¹²	18.77 ⁶	87.4 ⁴	22.30 ²⁰	45.3 ¹⁹
0.3	44.01 ¹¹	19.4 ¹³	20.25 ⁸	54.4 ¹¹	18.71 ⁹	87.8 ²	22.10 ²⁵	47.2 ¹⁵
0.3	43.90 ¹³	20.7 ¹⁰	20.17 ¹¹	55.5 ⁹	18.62 ¹¹	88.0 ¹	21.85 ³¹	48.7 ⁹
0.3	43.77 ¹³	21.7 ¹⁰	20.06 ¹¹	56.4 ⁹	18.51 ¹¹	87.9 ¹	21.54 ³¹	49.6 ⁹
0.2	1.108	-0.476	1.018	-0.190	1.145	+0.558	2.222	+1.985
0.2	39°.682	36''.93	15°.863	76''.15	13°.918	54''.88	15°.916	7''.54
0.1	-0.01	+0.03	0.00	+0.01	+0.01	-0.03	+0.02	-0.12
0.1	+0.4	+0.4	+0.4	+0.5	+0.4	+0.5	+0.4	+0.5

[Eph 13]

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	ξ Piscium. Mag. 4.8		β Arietis. Mag. 2.7		ψ Phœnicis. Mag. 4.4		ν C Mag.
	Right Ascension.	Declination N.	Right Ascension.	Declination N.	Right Ascension.	Declination S.	Right Ascension.
	h m I 49	° ' + 2 46	h m I 49	° ' + 20 23	h m I 50	° ' - 46 42	h m I 55
	s s	"	s s	"	s s	"	s s
Jan. 0.3	10.19	12.2	57.34	46.8	15.73	76.6	61.15
10.3	10.09 ¹⁰	11.6 ⁶	57.23 ¹¹	46.4 ⁴	15.51 ²²	77.4 ⁸	61.03 ¹²
20.2	9.97 ¹²	11.0 ⁶	57.11 ¹²	45.9 ⁵	15.27 ²⁴	77.6 ²	60.89 ¹⁴
30.2	9.85 ¹²	10.4 ⁶	56.98 ¹³	45.2 ⁷	15.03 ²⁴	77.3 ³	60.74 ¹⁵
Feb. 9.2	9.73 ¹²	10.0 ⁴	56.84 ¹⁴	44.5 ⁷	14.80 ²³	76.6 ⁷	60.60 ¹⁴
19.2	9.61 ¹¹	9.6 ²	56.71 ¹¹	43.6 ⁸	14.58 ²⁰	75.3 ¹⁷	60.46 ¹³
Mar. 1.1	9.50 ⁸	9.4 ¹	56.60 ¹¹	42.8 ⁹	14.38 ¹⁷	73.6 ²¹	60.33 ¹¹
11.1	9.42 ⁶	9.3 ¹	56.51 ⁶	41.9 ⁸	14.21 ¹³	71.5 ²⁴	60.22 ⁸
21.1	9.36 ²	9.4 ³	56.45 ³	41.1 ⁷	14.08 ⁹	69.1 ²⁸	60.14 ⁴
31.1	9.34 ¹	9.7 ⁵	56.42 ²	40.4 ⁵	13.99 ⁴	66.3 ³¹	60.10 ¹
Apr. 10.0	9.35 ⁶	10.2 ⁸	56.44 ⁶	39.9 ³	13.95 ²	63.2 ³²	60.09 ⁴
20.0	9.41 ¹⁰	11.0 ¹⁰	56.50 ¹¹	39.6 ¹	13.97 ⁸	60.0 ³³	60.13 ⁸
30.0	9.51 ¹⁵	12.0 ¹²	56.61 ¹⁶	39.5 ²	14.05 ¹³	56.7 ³⁴	60.21 ¹³
May 9.9	9.66 ¹⁹	13.2 ¹⁴	56.77 ²¹	39.7 ⁵	14.18 ¹⁹	53.3 ³⁴	60.34 ¹⁷
19.9	9.85 ²²	14.6 ¹⁶	56.98 ²⁴	40.2 ⁷	14.37 ²⁴	49.9 ³³	60.51 ²²
29.9	10.07 ²⁶	16.2 ¹⁸	57.22 ²⁸	40.9 ¹⁰	14.61 ²⁹	46.6 ³¹	60.73 ²⁵
June 8.9	10.33 ²⁹	18.0 ¹⁹	57.50 ³¹	41.9 ¹²	14.90 ³³	43.5 ²⁹	60.98 ²⁸
18.8	10.62 ³⁰	19.9 ¹⁹	57.81 ³²	43.1 ¹⁵	15.23 ³⁷	40.6 ²⁵	61.26 ³⁰
28.8	10.92 ³²	21.8 ²⁰	58.13 ³⁴	44.6 ¹⁶	15.60 ³⁸	38.1 ²²	61.56 ³²
July 8.8	11.24 ³²	23.8 ¹⁹	58.47 ³⁴	46.2 ¹⁸	15.98 ³⁹	35.9 ¹⁷	61.88 ³³
18.8	11.56 ³¹	25.7 ¹⁸	58.81 ³³	48.0 ¹⁸	16.37 ⁴⁰	34.2 ¹²	62.21 ³²
28.7	11.87 ³¹	27.5 ¹⁷	59.14 ³²	49.8 ¹⁸	16.77 ³⁸	33.0 ⁸	62.53 ³²
Aug. 7.7	12.18 ²⁸	29.2 ¹⁵	59.46 ³⁰	51.6 ¹⁹	17.15 ³⁷	32.2 ¹	62.85 ³⁰
17.7	12.46 ²⁷	30.7 ¹³	59.76 ²⁸	53.5 ¹⁸	17.52 ³⁴	32.1 ⁴	63.15 ²⁷
27.6	12.73 ²³	32.0 ¹⁰	60.04 ²⁶	55.3 ¹⁷	17.86 ³¹	32.5 ⁹	63.42 ²⁵
Sept. 6.6	12.96 ²¹	33.0 ⁸	60.30 ²²	57.0 ¹⁶	18.17 ²⁶	33.4 ¹⁴	63.67 ²²
16.6	13.17 ¹⁸	33.8 ⁶	60.52 ¹⁹	58.6 ¹⁴	18.43 ²¹	34.8 ¹⁸	63.89 ¹⁹
26.6	13.35 ¹⁵	34.4 ²	60.71 ¹⁶	60.0 ¹³	18.64 ¹⁶	36.6 ²²	64.08 ¹⁵
Oct. 6.5	13.50 ¹¹	34.6 ¹	60.87 ¹³	61.3 ⁹	18.80 ¹¹	38.8 ²⁵	64.23 ¹¹
16.5	13.61 ⁸	34.7 ²	61.00 ⁹	62.5 ⁹	18.91 ⁵	41.3 ²⁷	64.34 ⁸
26.5	13.69 ⁶	34.5 ³	61.09 ⁶	63.4 ⁷	18.96 ¹	44.0 ²⁷	64.42 ⁵
Nov. 5.5	13.75 ²	34.2 ⁴	61.15 ⁴	64.1 ⁶	18.97 ⁹	46.7 ²⁶	64.47 ¹
15.4	13.77 ⁰	33.8 ⁷	61.19 ³	64.7 ⁵	18.93 ⁴	49.3 ²³	64.48 ²
25.4	13.77 ³	33.2 ⁷	61.19 ⁵	65.1 ²	18.84 ¹³	51.8 ²⁵	64.46 ⁴
Dec. 5.4	13.74 ⁵	32.5 ⁷	61.16 ⁵	65.3 ¹	18.71 ¹⁷	54.1 ²⁰	64.42 ⁸
15.3	13.69 ⁷	31.8 ⁷	61.11 ⁷	65.4 ²	18.54 ¹⁹	56.1 ¹⁵	64.34 ¹⁰
25.3	13.62 ⁹	31.1 ⁶	61.04 ¹⁰	65.2 ³	18.35 ²¹	57.6 ¹¹	64.24 ¹¹
35.3	13.53	30.5	60.94	64.9	18.14	58.7	64.13
Sec δ , Tan δ	1.001	+0.048	1.067	+0.372	1.458	-1.062	1.075
Mean Place	9 ^h .215	6 ^m .08	56 ^h .440	34 ^m .70	14 ^h .194	68 ^m .20	59 ^h .966
$D'\psi a$, $D_{\omega} a$	0.00	0.00	0.00	-0.02	-0.01	+0.06	-0.01
$D\psi \delta$, $D_{\omega} \delta$	+0.4	+0.5	+0.4	+0.5	+0.4	+0.5	+0.3

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	α Hydri. Mag. 3.0		50 Cassiopeiæ. Mag. 4.1		γ Andromedæ <i>pr.</i> Mag. 2.3		α Arietis. Mag. 2.2	
	Right Ascension.	Declination S.	Right Ascension.	Declination N.	Right Ascension.	Declination N.	Right Ascension.	Declination N.
	h m 1 56	° ' 58	h m 1 56	° ' 72 0	h m 1 58	° ' 41 55	h m 2 2	° ' 23 3
Jan. 0.3	7.22	70.4	10.03	62.9	41.45	39.2	23.65	52.8
10.3	6.84 ³⁸	71.0 ⁶	9.51 ⁵²	63.9 ¹⁰	41.30 ¹⁵	39.4 ²	23.54 ¹¹	52.5 ³
20.3	6.44 ⁴⁰	71.0 ⁰	8.94 ⁵⁷	64.4 ⁵	41.12 ¹⁸	39.2 ²	23.42 ¹²	52.1 ⁴
30.2	6.03 ⁴¹	70.5 ⁵	8.35 ⁵⁹	64.2 ⁸	40.93 ¹⁹	38.7 ⁵	23.29 ¹³	51.5 ⁶
Feb. 9.2	5.64 ³⁹	69.4 ¹¹	7.77 ⁵⁸	63.4 ⁸	40.74 ¹⁹	37.8 ⁹	23.14 ¹⁵	50.8 ⁷
19.2	5.27 ³⁷	67.7 ¹⁷	7.22 ⁵⁵	62.1 ¹³	40.56 ¹⁸	36.7 ¹¹	23.00 ¹⁴	49.9 ⁹
Mar. 1.1	4.93 ³⁴	65.6 ²¹	6.73 ⁴⁹	60.4 ¹⁷	40.39 ¹⁷	35.3 ¹⁴	22.88 ¹²	49.0 ⁹
11.1	4.64 ²⁹	63.1 ²⁵	6.31 ⁴²	58.2 ²²	40.25 ¹⁴	33.7 ¹⁶	22.78 ¹⁰	48.1 ⁹
21.1	4.40 ²⁴	60.2 ²⁹	6.00 ³¹	55.7 ²⁵	40.16 ⁹	32.0 ¹⁷	22.70 ⁸	47.2 ⁹
31.1	4.23 ¹⁷	57.0 ³²	5.81 ¹⁹	53.0 ²⁷	40.11 ⁵	30.3 ¹⁷	22.66 ⁴	46.4 ⁸
Apr. 10.0	4.12 ¹¹	53.5 ³⁵	5.75 ⁶	50.3 ²⁷	40.11 ⁰	28.7 ¹⁶	22.67 ¹	45.7 ⁷
20.0	4.10 ²	49.9 ³⁶	5.83 ⁸	47.5 ²⁸	40.17 ⁶	27.1 ¹⁶	22.72 ⁵	45.3 ⁴
30.0	4.15 ⁵	46.2 ³⁷	6.04 ²¹	44.9 ²⁶	40.29 ¹²	25.8 ¹³	22.82 ¹⁰	45.0 ³
May 10.0	4.28 ¹³	42.5 ³⁷	6.39 ³⁵	42.6 ²³	40.47 ¹⁸	24.8 ¹⁰	22.98 ¹⁶	45.0 ⁰
19.9	4.49 ²¹	38.9 ³⁶	6.85 ⁴⁶	40.5 ²¹	40.71 ²⁴	24.0 ⁸	23.17 ¹⁹	45.2 ²
29.9	4.78 ²⁹	35.4 ³⁵	7.43 ⁵⁸	38.8 ¹⁷	41.00 ²⁹	23.6 ⁴	23.41 ²⁴	45.8 ⁶
June 8.9	5.13 ³⁵	32.2 ³²	8.10 ⁶⁷	37.5 ¹³	41.33 ³³	23.5 ¹	23.69 ²⁸	46.6 ⁸
18.8	5.54 ⁴¹	29.3 ²⁹	8.84 ⁷⁴	36.8 ⁷	41.69 ³⁶	23.9 ⁴	23.99 ³⁰	47.6 ¹⁰
28.8	6.00 ⁴⁶	26.7 ²⁶	9.64 ⁸⁰	36.5 ³	42.08 ³⁹	24.6 ⁷	24.31 ³²	48.9 ¹³
July 8.8	6.50 ⁵⁰	24.7 ²⁰	10.47 ⁸³	36.7 ²	42.48 ⁴⁰	25.6 ¹⁰	24.65 ³⁴	50.4 ¹⁵
18.8	7.02 ⁵²	23.1 ¹⁰	11.31 ⁸⁴	37.4 ¹²	42.88 ⁴⁰	26.9 ¹⁶	25.00 ³⁴	52.0 ¹⁷
28.7	7.54 ⁵²	22.1 ⁴	12.15 ⁸²	38.6 ¹⁶	43.28 ³⁹	28.5 ¹⁸	25.34 ³³	53.7 ¹⁸
Aug. 7.7	8.06 ⁵⁰	21.7 ²	12.97 ⁷⁷	40.2 ²¹	43.67 ³⁷	30.3 ²⁰	25.67 ³²	55.5 ¹⁹
17.7	8.56 ⁴⁶	21.9 ⁷	13.74 ⁷²	42.3 ²⁴	44.04 ³⁵	32.3 ²²	25.99 ²⁹	57.4 ¹⁸
27.7	9.02 ⁴¹	22.6 ¹⁴	14.46 ⁶⁶	44.7 ²⁷	44.39 ³¹	34.5 ²³	26.28 ²⁶	59.2 ¹⁷
Sept. 6.6	9.43 ³⁶	24.0 ¹⁸	15.12 ⁵⁸	47.4 ³⁰	44.70 ²⁸	36.8 ²⁴	26.54 ²⁴	60.9 ¹⁷
16.6	9.79 ²⁸	25.8 ²³	15.70 ⁵⁰	50.4 ³²	44.98 ²⁴	39.2 ²⁴	26.78 ²¹	62.6 ¹⁵
26.6	10.07 ²¹	28.1 ²⁶	16.20 ⁴¹	53.6 ³⁴	45.22 ²¹	41.6 ²³	26.99 ¹⁷	64.1 ¹⁴
Oct. 6.5	10.28 ¹⁴	30.7 ³¹	16.61 ²¹	57.0 ³⁴	45.43 ¹⁶	43.9 ²²	27.16 ¹¹	65.5 ¹²
16.5	10.42 ⁵	33.6 ²⁹	16.92 ²¹	60.4 ³⁴	45.59 ¹²	46.1 ²²	27.30 ¹¹	66.7 ¹¹
26.5	10.47 ³	36.7 ³⁰	17.13 ¹⁰	63.8 ³⁴	45.71 ⁹	48.3 ²⁰	27.41 ⁸	67.8 ⁹
Nov. 5.5	10.44 ¹¹	39.7 ³⁰	17.23 ¹	67.2 ³²	45.80 ⁴	50.3 ¹⁸	27.49 ⁵	68.7 ⁷
15.4	10.33 ¹⁷	42.7 ²⁸	17.22 ²⁰	70.4 ³⁶	45.84 ⁰	52.1 ¹⁶	27.54 ¹	69.4 ⁵
25.4	10.16 ²⁴	45.5 ²¹	17.11 ³¹	73.4 ²³	45.84 ⁷	53.7 ¹⁰	27.55 ⁵	69.9 ⁴
Dec. 5.4	9.92 ³⁰	47.9 ²¹	16.89 ³¹	76.0 ²³	45.81 ³	55.1 ¹⁰	27.54 ⁵	70.3 ²
15.4	9.62 ³⁴	50.0 ¹⁵	16.58 ⁴⁰	78.3 ¹⁹	45.74 ¹¹	56.1 ⁷	27.49 ⁷	70.5 ⁰
25.3	9.28 ³⁷	51.5 ¹⁰	16.18 ⁴⁹	80.2 ¹³	45.63 ¹⁴	56.8 ⁴	27.42 ⁹	70.5 ²
35.3	8.91	52.5	15.69	81.5	45.49	57.2	27.33	70.3
δ , Tan δ	2.129	-1.879	3.239	+3.081	1.344	+0.898	1.087	+0.426
Place	5°.081	59''.49	8°.901	38''.42	40°.520	20''.73	22°.676	39''.78
δ , D. δ	-0.02	+0.11	+0.04	-0.18	+0.01	-0.05	+0.01	-0.02
δ , D. δ	+0.3	+0.5	+0.3	+0.5	+0.3	+0.5	+0.3	+0.5

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	β Trianguli. Mag. 3.1		δ Cassiopeiæ. Mag. 6.2		ϵ Persæi. Mag. 5.4		ξ^1 Ceti. Mag. 4.5	
	Right Ascension.	Declination N.	Right Ascension.	Declination N.	Right Ascension.	Declination N.	Right Ascension.	Declination N.
	h m s 2 4	° ' " + 34 35	h m s 2 7	° ' " + 66 7	h m s 2 7	° ' " + 50 40	h m s 2 8	° ' " + 8 26
Jan. 0.3	29.82	25.3	48.84	59.8	57.66	38.2	30.61	62.6
10.3	29.69 ¹³	25.3 ⁰	48.48 ³⁶	60.8 ¹⁰	57.47 ¹⁹	38.7 ⁵	30.51 ¹⁰	62.0 ⁶
20.3	29.55 ¹⁴	25.0 ³	48.08 ⁴⁰	61.2 ⁴	57.25 ²³	38.8 ¹	30.40 ¹¹	61.4 ⁶
30.2	29.39 ¹⁶	24.5 ⁵	47.66 ⁴²	61.1 ¹	57.02 ²²	38.4 ⁴	30.28 ¹²	60.8 ⁶
Feb. 9.2	29.22 ¹⁷	23.7 ⁸	47.24 ⁴²	60.4 ⁷	56.77 ²⁵	37.7 ⁷	30.15 ¹³	60.3 ⁵
19.2	29.05 ¹⁷	22.7 ¹⁰	46.83 ⁴¹	59.2 ¹²	56.54 ²³	36.5 ¹²	30.02 ¹³	59.8 ⁵
Mar. 1.1	28.91 ¹⁴	21.5 ¹²	46.45 ³⁸	57.6 ¹⁶	56.33 ²¹	35.0 ¹⁵	29.90 ¹²	59.4 ⁴
11.1	28.78 ¹³	20.2 ¹³	46.13 ³²	55.6 ²⁰	56.15 ¹⁸	33.3 ¹⁷	29.80 ¹⁰	59.1 ³
21.1	28.69 ⁹	18.8 ¹⁴	45.89 ²⁴	53.3 ²³	56.01 ¹⁴	31.4 ¹⁹	29.73 ⁷	58.9 ²
31.1	28.65 ⁴	17.4 ¹⁴	45.73 ¹⁶	50.8 ²⁵	55.93 ⁸	29.3 ²¹	29.69 ⁴	58.9 ⁰
Apr. 10.0	28.65 ⁰	16.1 ¹³	45.67 ⁶	48.2 ²⁶	55.91 ²	27.3 ²⁰	29.69 ⁰	59.1 ²
20.0	28.70 ⁵	15.0 ¹¹	45.72 ⁵	45.7 ²⁵	55.97 ⁶	25.4 ¹⁹	29.73 ⁴	59.4 ³
30.0	28.81 ¹¹	14.1 ⁹	45.87 ¹⁵	43.3 ²⁴	56.09 ¹²	23.6 ¹⁸	29.82 ⁹	60.0 ⁶
May 10.0	28.97 ¹⁶	13.4 ⁷	46.13 ²⁶	41.0 ²³	56.28 ¹⁹	22.0 ¹⁶	29.95 ¹³	60.8 ⁸
19.9	29.18 ²¹	13.0 ⁴	46.49 ³⁶	39.1 ¹⁹	56.54 ²⁶	20.8 ¹²	30.12 ¹⁷	61.9 ¹¹
29.9	29.44 ²⁶	12.9 ¹	46.93 ⁴⁴	37.5 ¹⁶	56.85 ³¹	19.9 ⁹	30.34 ²²	63.2 ¹³
June 8.9	29.74 ³⁰	13.2 ³	47.45 ⁵²	36.4 ¹¹	57.21 ³⁶	19.3 ⁶	30.59 ²⁵	64.6 ¹⁴
18.8	30.07 ³³	13.7 ⁵	48.03 ⁵⁸	35.7 ⁷	57.62 ⁴¹	19.2 ¹	30.87 ²⁸	66.3 ¹⁷
28.8	30.43 ³⁶	14.6 ⁹	48.66 ⁶³	35.3 ³	58.06 ⁴⁴	19.5 ³	31.17 ³⁰	68.0 ¹⁷
July 8.8	30.80 ³⁷	15.8 ¹²	49.31 ⁶⁵	35.6 ²	58.51 ⁴⁵	20.1 ⁶	31.48 ³³	69.8 ¹⁸
18.8	31.17 ³⁷	17.2 ¹⁴	49.98 ⁶⁷	36.3 ⁷	58.97 ⁴⁶	21.1 ¹⁰	31.81 ³³	71.6 ¹⁸
28.7	31.54 ³⁷	18.8 ¹⁶	50.65 ⁶⁷	37.4 ¹¹	59.43 ⁴⁶	22.5 ¹⁴	32.13 ³²	73.3 ¹⁷
Aug. 7.7	31.91 ³⁷	20.6 ¹⁸	51.30 ⁶⁵	37.4 ¹⁶	59.88 ⁴⁵	22.5 ¹⁷	32.44 ³¹	75.0 ¹⁷
17.7	32.25 ³⁴	22.6 ²⁰	51.93 ⁶³	39.0 ¹⁹	60.31 ⁴³	24.2 ²⁰	32.73 ²⁹	76.6 ¹⁶
27.7	32.58 ³³	24.6 ²⁰	52.51 ⁵⁸	40.9 ²³	60.71 ⁴⁰	26.2 ²²	33.01 ²⁸	78.0 ¹⁴
Sept. 6.6	32.87 ²⁹	26.6 ²⁰	53.05 ⁵⁴	43.2 ²⁵	61.08 ³⁷	28.4 ²⁴	33.26 ²⁵	80.3 ¹³
16.6	33.13 ²⁶	28.7 ²¹	53.54 ⁴⁹	45.7 ²⁸	61.41 ³³	30.8 ²⁵	33.49 ²³	82.2 ¹⁰
26.6	33.36 ²³	30.7 ²⁰	53.96 ⁴²	48.5 ³⁰	61.70 ²⁹	33.3 ²⁶	33.69 ²⁰	84.3 ⁸
Oct. 6.5	33.56 ²⁰	32.7 ²⁰	54.31 ³⁵	51.5 ³²	61.95 ²⁵	35.9 ²⁶	33.99 ¹⁷	86.1 ⁶
16.5	33.72 ¹²	34.6 ¹⁹	54.59 ²⁸	54.7 ³²	62.15 ²⁰	38.5 ²⁶	34.22 ¹³	88.1 ³
26.5	33.84 ⁹	36.3 ¹⁷	54.80 ²¹	57.9 ³²	62.30 ¹⁵	41.1 ²⁶	34.49 ¹¹	90.3 ²
Nov. 5.5	33.93 ⁹	37.9 ¹⁶	54.92 ¹²	61.1 ³¹	62.41 ¹¹	43.7 ²⁴	34.77 ⁸	92.6 ⁰
15.4	33.98 ⁵	39.3 ¹⁴	54.97 ⁵	64.2 ³¹	62.46 ¹¹	46.1 ²⁴	34.99 ⁸	94.9 ²
25.4	33.99 ¹	40.5 ¹²	54.93 ⁴	67.2 ³⁰	62.47 ⁵	48.4 ²³	35.22 ⁴	97.2 ³
Dec. 5.4	33.97 ²	41.5 ¹⁰	54.82 ¹¹	70.0 ²⁸	62.47 ¹	50.5 ²¹	35.44 ²	99.5 ³
15.4	33.92 ⁵	42.2 ⁷	54.63 ¹⁹	72.5 ²⁵	62.43 ⁴	52.3 ¹⁸	35.66 ¹	101.8 ⁴
25.3	33.84 ⁸	42.7 ⁵	54.37 ²⁶	74.7 ²²	62.34 ⁹	53.8 ¹⁵	35.88 ⁴	104.1 ⁵
35.3	33.73 ¹¹	42.9 ²	54.04 ³³	76.4 ¹⁷	62.21 ¹³	55.0 ¹²	36.10 ⁶	106.4 ⁵
				77.7 ¹³	62.04 ¹⁷	55.7 ⁷	36.32 ⁸	108.7 ⁶
Sec δ , Tan δ	1.215	+0.690	2.471	+2.260	1.578	+1.221	1.011	+0.149
Mean Place	28°.842	8'".76	47°.612	36'".26	56°.608	17'".60	29°.556	54'".17
D ψ α , D μ α	+0.01	-0.04	+0.03	-0.13	+0.02	-0.07	0.00	-0.01
D ψ δ , D μ δ	+0.3	+0.5	+0.3	+0.5	+0.3	+0.5	+0.3	+0.5

[Eph 13]

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	μ Fornacis. Mag. 5.2		γ Trianguli. Mag. 4.1		δ Ceti. Mag. 5.7		ϕ Eridani. Mag. 3.8	
	Right Ascension.	Declination S.	Right Ascension.	Declination N.	Right Ascension.	Declination S.	Right Ascension.	Declination S.
	h m s	° ' "	h m s	° ' "	h m s	° ' "	h m s	° ' "
	2 9	-31 6	2 12	+33 27	2 12	-6 48	2 13	-51 53
Jan. 0.3	10.99	84.8	16.41	32.9	45.71	44.9	30.10	87.7
10.3	10.84 ¹⁵	85.8 ¹⁰	16.29 ¹²	32.9 ⁰	45.61 ¹⁰	45.7 ⁸	29.84 ²⁶	88.7 ¹⁰
20.3	10.68 ¹⁶	86.4 ⁶	16.15 ¹⁴	32.7 ²	45.49 ¹²	46.4 ⁷	29.56 ²⁸	89.2 ⁵
30.2	10.51 ¹⁷	86.6 ²	15.99 ¹⁶	32.2 ⁵	45.36 ¹³	46.9 ⁵	29.27 ²⁹	89.1 ¹
Feb. 9.2	10.33 ¹⁸	86.4 ²	15.82 ¹⁷	31.5 ⁷	45.23 ¹³	47.2 ³	28.99 ²⁸	88.4 ⁷
19.2	10.16 ¹⁷	85.8 ⁶	15.66 ¹⁶	30.5 ¹⁰	45.10 ¹³	47.4 ²	28.71 ²⁸	87.3 ¹¹
Mar. 1.2	10.01 ¹⁵	84.8 ¹⁰	15.51 ¹⁵	29.4 ¹¹	44.97 ¹³	47.3 ¹	28.45 ²⁶	85.7 ¹⁶
11.1	9.87 ¹⁴	83.4 ¹⁴	15.38 ¹³	29.2 ¹²	44.87 ¹⁰	46.9 ⁴	28.22 ²³	83.6 ²¹
21.1	9.76 ¹¹	81.7 ¹⁷	15.29 ⁹	26.9 ¹³	44.79 ⁸	46.4 ⁵	28.03 ¹⁹	81.1 ²⁵
31.1	9.69 ⁷	79.7 ²⁰	15.23 ⁶	25.6 ¹³	44.74 ⁵	45.6 ⁸	27.89 ¹⁴	78.3 ²⁸
Apr. 10.0	9.66 ³	77.4 ²³	15.23 ⁰	24.4 ¹²	44.72 ²	44.5 ¹¹	27.80 ⁹	75.2 ³¹
20.0	9.67 ¹	74.8 ²⁶	15.27 ⁴	23.3 ¹¹	44.75 ³	43.2 ¹³	27.77 ³	71.9 ³³
30.0	9.73 ⁶	72.1 ²⁷	15.37 ¹⁰	22.4 ⁹	44.83 ⁸	41.7 ¹⁵	27.80 ³	68.4 ³⁵
May 10.0	9.84 ¹¹	69.2 ²⁹	15.52 ¹⁵	21.8 ⁶	44.95 ¹²	40.1 ¹⁶	27.90 ¹⁰	64.9 ³⁵
19.9	10.00 ¹⁶	66.3 ²⁹	15.72 ²⁰	21.4 ¹	45.11 ¹⁶	38.2 ¹⁹	28.06 ¹⁶	61.4 ³⁵
29.9	10.20 ²⁰	63.3 ³⁰	15.97 ²⁵	21.3 ¹	45.31 ²⁰	36.2 ²⁰	28.28 ²²	57.9 ³⁵
June 8.9	10.45 ²⁵	60.4 ²⁹	16.26 ²⁹	21.6 ³	45.55 ²⁴	34.1 ²¹	28.56 ²⁸	54.6 ³³
18.9	10.73 ²⁸	57.6 ²⁸	16.59 ³³	21.6 ⁶	45.55 ²⁷	34.1 ²²	28.56 ³³	54.6 ³³
28.8	11.04 ³¹	55.0 ²⁶	16.94 ³⁵	22.2 ⁸	45.82 ²⁹	31.9 ²¹	28.89 ³⁶	51.6 ³⁰
July 8.8	11.36 ³²	52.7 ²³	17.30 ³⁶	23.0 ¹¹	46.11 ³⁰	29.8 ²¹	29.25 ⁴⁰	48.9 ²⁷
18.8	11.70 ³⁴	50.7 ²⁰	17.67 ³⁷	24.1 ¹⁴	46.41 ³²	27.7 ¹⁹	29.65 ⁴²	46.6 ²³
28.7	12.04 ³⁴	49.1 ¹⁶	18.04 ³⁷	25.5 ¹⁶	46.73 ³¹	25.8 ¹⁸	30.07 ⁴²	44.7 ¹⁴
Aug. 7.7	12.37 ³³	47.9 ¹²	18.40 ³⁶	27.1 ¹⁷	47.04 ³¹	24.0 ¹⁵	30.49 ⁴²	43.3 ⁸
17.7	12.69 ³²	47.2 ⁷	18.74 ³⁴	28.8 ¹⁹	47.35 ³¹	22.5 ¹³	30.91 ⁴⁰	42.5 ²
27.7	12.99 ³⁰	47.0 ²	19.07 ³³	30.7 ¹⁹	47.64 ²⁹	21.2 ¹⁰	31.31 ³⁹	42.3 ³
Sept. 6.6	13.26 ²⁷	47.2 ²	19.37 ³⁰	32.6 ²⁰	47.92 ²⁵	20.2 ⁷	31.70 ³⁴	42.6 ⁹
16.6	13.50 ²⁴	47.9 ⁷	19.63 ²⁶	34.6 ¹⁹	48.17 ²²	19.5 ³	32.04 ³¹	43.5 ¹⁴
26.6	13.71 ²¹	47.9 ¹²	19.87 ²⁴	36.5 ²⁰	48.39 ²⁰	19.2 ⁰	32.35 ²⁶	44.9 ¹⁹
Oct. 6.6	13.88 ¹⁷	49.1 ¹⁵	20.07 ²⁰	38.5 ¹⁹	48.59 ¹⁷	19.2 ⁰	32.61 ²⁰	46.8 ²³
16.5	14.01 ¹³	50.6 ¹⁸	20.24 ¹⁷	40.4 ¹⁸	48.76 ¹³	19.4 ⁶	32.81 ¹⁵	49.1 ²⁶
26.5	14.09 ⁸	52.4 ²⁰	20.42 ¹³	42.2 ¹⁶	48.89 ¹⁰	20.0 ⁸	32.96 ⁸	51.7 ²⁸
Nov. 5.5	14.09 ⁵	54.4 ²²	20.37 ⁹	43.8 ¹⁵	48.99 ⁸	20.8 ⁹	33.04 ³	54.5 ³⁰
15.4	14.14 ²	56.6 ²³	20.46 ⁶	45.3 ¹³	49.07 ⁴	21.7 ¹¹	33.07 ³	57.5 ²⁹
25.4	14.16 ³	58.9 ²²	20.52 ³	46.6 ¹²	49.11 ¹	22.8 ¹¹	33.04 ⁸	60.4 ²⁸
Dec. 5.4	14.13 ⁶	61.1 ²⁰	20.55 ¹	47.8 ⁹	49.12 ¹	23.9 ¹²	32.96 ¹³	63.2 ²⁵
15.4	14.07 ⁸	63.1 ¹⁹	20.54 ⁴	48.7 ⁷	49.11 ⁵	25.1 ¹¹	32.83 ¹⁸	65.7 ²²
25.3	13.99 ¹¹	65.0 ¹⁶	20.50 ⁸	49.4 ⁵	49.06 ⁶	26.2 ¹⁰	32.65 ²¹	67.9 ¹⁸
35.3	13.88 ¹⁴	66.6 ¹³	20.42 ¹¹	49.9 ²	49.00 ⁹	27.2 ¹⁰	32.44 ²⁵	69.7 ¹⁴
Dec 3, Tan δ	1.168	-0.604	1.199	+0.661	1.007	-0.119	1.621	-1.275
Mean Place	9°.631	80''.88	15°.373	16''.74	44°.552	48''.36	28°.273	79''.30
$\Delta\alpha$, $\Delta\delta$ a	-0.01	+0.03	+0.01	-0.04	0.00	+0.01	-0.02	+0.07
$\Delta\alpha$, $\Delta\delta$ δ	+0.3	+0.5	+0.3	+0.5	+0.3	+0.5	+0.3	+0.5

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	o Ceti. (Mira.) Var. 1.7-9.6		κ Fornacis. Mag. 5.4		δ Hydri. Mag. 4.3		ι Cassiope Mag. 4.
	Right Ascension.	Declination S.	Right Ascension.	Declination S.	Right Ascension.	Declination S.	Right Ascension.
	h m 2 15	° ' " — 3 21	h m 2 18	° ' " — 24 11	h m 2 20	° ' " — 69 2	h m 2 22
	s	"	s	"	s	"	s
Jan. 0.3	4.24	42.1	40.48	69.8	16.82	55.8	4.22
10.3	4.14	42.9	40.35	70.8	16.28	56.6	3.86
20.3	4.03	43.5	40.21	71.5	15.71	56.9	3.45
30.2	3.90	44.1	40.06	71.9	15.13	56.6	3.01
Feb. 9.2	3.77	44.5	39.90	71.9	14.56	55.7	2.57
19.2	3.64	44.7	39.74	71.6	14.00	54.2	2.13
Mar. 1.2	3.52	44.7	39.59	70.9	13.48	52.2	1.72
11.1	3.41	44.5	39.46	69.9	13.02	49.7	1.37
21.1	3.33	44.1	39.36	68.5	12.62	46.9	1.08
31.1	3.28	43.5	39.28	66.8	12.29	43.7	0.89
Apr. 10.0	3.27	42.7	39.25	64.9	12.06	40.3	0.80
20.0	3.30	41.6	39.26	62.7	11.93	36.6	0.81
30.0	3.37	40.3	39.32	60.3	11.89	32.9	0.94
May 10.0	3.49	38.8	39.42	57.8	11.96	29.1	1.17
19.9	3.65	37.2	39.57	55.1	12.13	25.4	1.51
29.9	3.85	35.3	39.77	52.4	12.40	21.9	1.94
June 8.9	4.09	33.4	40.00	49.6	12.77	18.5	2.45
18.9	4.35	31.4	40.27	47.0	13.22	15.5	3.04
28.8	4.64	29.3	40.56	44.5	13.74	12.8	3.67
July 8.8	4.95	27.3	40.87	42.2	14.32	10.6	4.34
18.8	5.26	25.4	41.20	40.1	14.94	8.9	5.03
28.7	5.58	23.6	41.52	38.4	15.58	7.8	5.72
Aug. 7.7	5.89	22.0	41.85	37.1	16.23	7.3	6.41
17.7	6.18	20.7	42.16	36.1	16.87	7.3	7.07
27.7	6.46	19.6	42.45	35.6	17.47	8.0	7.69
Sept. 6.6	6.71	18.8	42.72	35.6	18.02	9.2	8.28
16.6	6.94	18.3	42.96	36.0	18.51	11.0	8.81
26.6	7.13	18.1	43.16	36.8	18.91	13.3	9.27
Oct. 6.6	7.30	18.2	43.33	37.9	19.22	16.0	9.67
16.5	7.44	18.6	43.47	39.4	19.43	18.9	10.00
26.5	7.55	19.1	43.57	41.1	19.53	22.1	10.25
Nov. 5.5	7.62	19.9	43.64	43.0	19.52	25.3	10.42
15.4	7.67	20.8	43.67	45.0	19.40	28.5	10.50
25.4	7.69	21.7	43.67	47.0	19.18	31.4	10.50
Dec. 5.4	7.68	22.8	43.64	48.9	18.87	34.1	10.41
15.4	7.64	23.8	43.57	50.7	18.48	36.4	10.24
25.3	7.57	24.7	43.48	52.2	18.01	38.2	10.00
35.3	7.49	25.6	43.37	53.5	17.50	39.4	9.67
Sec δ, Tan δ	1.002	-0.059	1.006	-0.449	2.796	-2.611	2.562
Mean Place	3 ^h .092	46 ^m .70	39 ^h .156	68 ^m .11	13 ^h .900	45 ^m .34	2 ^h .701
D'ψ α D ₀₀ α	0.00	0.00	-0.01	+0.02	-0.04	+0.14	+0.04
D'ψ δ, D ₀₀ δ	+0.3	+0.6	+0.3	+0.6	+0.3	+0.6	+0.3

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	ξ^3 Ceti. Mag. 4.3		σ Ceti. Mag. 4.8		36 H. Cassiopeiæ. Mag. 5.3		ν Ceti. Mag. 5.0	
	Right Ascension.	Declination N.	Right Ascension.	Declination S.	Right Ascension.	Declination N.	Right Ascension.	Declination N.
	h m 2 23	° ' " + 8 4	h m 2 28	° ' " - 15 36	h m 2 29	° ' " + 72 26	h m 2 31	° ' " + 5 13
	s 23	" 4	s 28	" 36	s 29	" 26	s 31	" 13
Jan. 0.3	39.39	55.2 6	4.72	60.1	57.31	74.9	25.87	30.4
10.3	39.30 9	54.6 6	4.62 10	61.1 10	56.83 48	76.3 14	25.78 9	29.7 7
20.3	39.19 11	54.0 6	4.49 13	61.9 8	56.28 55	77.1 8	25.68 10	29.1 6
30.2	39.06 13	53.5 5	4.35 14	62.4 5	55.69 59	77.4 3	25.55 13	28.6 5
Feb. 9.2	38.93 13	53.0 5	4.20 15	62.7 3	55.08 61	77.1 3	25.42 13	28.1 5
					60			
19.2	38.80	52.5	4.06	62.6	54.48	76.2	25.28	27.7
Mar. 1.2	38.67 13	52.1 4	3.92 14	62.3 3	53.92 56	74.8 14	25.15 13	27.4 3
11.1	38.56 11	51.8 3	3.79 13	61.6 7	53.43 49	72.9 19	25.04 11	27.2 2
21.1	38.48 8	51.7 1	3.69 10	60.7 9	53.03 40	70.7 22	24.95 9	27.2 0
31.1	38.42 6	51.7 0	3.62 7	59.5 12	52.74 29	68.2 25	24.89 6	27.2 1
					16			
Apr. 10.1	38.40	51.8	3.58	58.0	52.58	65.6	24.86	27.6
20.0	38.43 3	52.2 4	3.59 1	56.3 17	52.56 2	62.9 27	24.88 2	28.2 6
30.0	38.50 7	52.8 6	3.64 5	54.4 19	52.68 12	60.2 27	24.94 6	28.9 7
May 10.0	38.62 12	53.6 8	3.74 10	52.2 22	52.93 25	57.6 26	25.05 11	29.9 10
19.9	38.78 16	54.7 11	3.89 15	49.9 23	53.32 39	55.3 23	25.20 15	31.1 12
					52			
29.9	38.98	55.9	4.07	47.6	53.84	53.3	25.39	32.4
June 8.9	39.22 24	57.3 14	4.30 23	45.1 25	54.46 62	51.7 16	25.63 24	34.0 16
18.9	39.49 27	58.9 16	4.55 25	42.7 24	55.17 71	50.5 12	25.89 26	35.6 16
28.8	39.79 30	60.6 17	4.83 28	40.4 23	55.95 78	49.8 7	26.18 29	37.4 18
July 8.8	40.10 31	62.3 17	5.14 31	38.1 23	56.78 83	49.5 3	26.48 30	39.2 18
					86			
18.8	40.42 32	64.1 17	5.45 32	36.1 18	57.64 87	49.7 7	26.79 32	40.9 17
28.8	40.74 32	65.8 17	5.77 32	34.3 18	58.51 87	50.4 12	27.11 32	42.6 17
Aug. 7.7	41.05 31	67.5 17	6.08 31	32.9 14	59.38 87	51.6 12	27.42 31	44.3 17
17.7	41.35 30	69.0 15	6.38 30	31.7 12	60.22 84	53.2 16	27.73 31	45.8 15
27.7	41.64 29	70.3 13	6.67 29	30.9 8	61.03 81	55.1 19	28.01 28	47.0 12
					75			
Sept. 6.6	41.90	71.5 10	6.93 24	30.6 0	61.78 69	57.5 26	28.28 24	48.1 8
16.6	42.14 24	72.5 7	7.17 21	30.6 0	62.47 61	60.1 29	28.52 24	48.9 6
26.6	42.35 18	73.2 5	7.38 18	31.0 4	63.08 61	63.0 31	28.73 21	49.5 4
Oct. 6.6	42.53 15	73.7 3	7.56 14	31.7 10	63.61 53	66.1 32	28.92 19	49.9 1
16.5	42.68 12	74.0 1	7.70 12	32.7 13	64.04 43	69.3 33	29.07 15	50.0 1
					33			
26.5	42.80	74.1 0	7.82 8	34.0 15	64.37 22	72.6 33	29.20 10	49.9 3
Nov. 5.5	42.89 6	74.1 0	7.90 5	35.5 16	64.59 12	75.9 33	29.30 7	49.6 4
15.5	42.95 4	73.8 3	7.95 2	37.1 16	64.71 0	79.2 31	29.37 4	49.2 5
25.4	42.99 3	73.5 1	7.97 4	38.7 16	64.71 0	82.3 28	29.41 2	48.7 6
Dec. 5.4	42.99 3	73.1 5	7.95 4	40.3 16	64.59 23	85.1 26	29.41 2	48.1 7
15.4	42.96 5	72.6 6	7.91 7	41.9 14	64.36 34	87.7 21	29.39 5	47.4 6
25.3	42.91 8	72.0 6	7.84 9	43.3 11	64.02 42	89.8 17	29.34 7	46.8 7
35.3	42.83	71.4	7.75	44.4	63.60 42	91.5	29.27	46.1
Star, Tan δ	1.010	+0.142	1.038	-0.279	3.317	+3.162	1.004	+0.091
Mean Place	38°.244	46''.74	3°.433	61''.26	55°.347	50''.86	24°.676	22''.74
$\Delta\alpha, D_{\alpha}\alpha$	0.00	-0.01	0.00	+0.01	+0.05	-0.17	0.00	-0.01
$\Delta\delta, D_{\delta}\delta$	+0.3	+0.6	+0.3	+0.6	+0.3	+0.6	+0.3	+0.6

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	μ Hydri. Mag. 5.3		ν Arietis. Mag. 5.4		δ Ceti. Mag. 4.0		ϵ Hydri. Mag. 4.3	
	Right Ascension.	Declination S.	Right Ascension.	Declination N.	Right Ascension.	Declination S.	Right Ascension.	Declination S.
	h m 2 33	° ' " -79 28	h m 2 33	° ' " +21 35	h m 2 35	° ' " - 0 1	h m 2 38	° ' " -68 3
Jan. 0.3	31.91 ^s	59.8 ["]	60.39 ^s	52.6 ["]	8.69 ^s	69.0 ["]	19.67 ^s	61.1 ["]
10.3	30.75 ¹¹⁶	60.7 ⁹	60.30 ⁹	52.4 ²	8.61 ⁸	69.7 ⁷	19.15 ⁵²	62.2 ¹
20.3	29.52 ¹²³	61.0 ³	60.18 ¹²	52.1 ³	8.50 ¹¹	70.4 ⁷	18.60 ⁵⁵	62.7
30.2	28.26 ¹²⁶	60.6 ⁴	60.05 ¹³	51.6 ⁵	8.37 ¹³	71.0 ⁶	18.02 ⁵⁸	62.7
Feb. 9.2	27.02 ¹²⁴	59.7 ⁹	59.90 ¹⁵	51.1 ⁵	8.24 ¹³	71.5 ⁵	17.44 ⁵⁸	62.0
19.2	25.81 ¹²¹	58.2 ¹⁵	59.75 ¹⁵	50.4 ⁷	8.10 ¹⁴	71.8 ³	16.87 ⁵⁷	60.8
Mar. 1.2	24.67 ¹¹⁴	56.2 ²⁰	59.61 ¹⁴	49.7 ⁷	7.97 ¹²	71.9 ¹	16.34 ⁵³	59.1
11.1	23.64 ¹⁰³	53.8 ²⁴	59.49 ¹²	48.9 ⁸	7.85 ¹³	71.9 ⁰	15.85 ⁴⁹	56.9
21.1	22.73 ⁹¹	50.9 ²⁹	59.39 ¹⁰	48.2 ⁷	7.75 ¹⁰	71.7 ²	15.41 ⁴⁴	54.2
31.1	21.97 ⁷⁶	47.7 ³²	59.32 ⁷	47.5 ⁷	7.69 ⁶	71.3 ⁴	15.05 ³⁶	51.2
Apr. 10.1	21.37 ⁶⁰	44.3 ³⁴	59.30 ²	46.9 ⁶	7.66 ³	70.7 ⁶	14.78 ²⁷	47.9
20.0	20.94 ⁴³	40.7 ³⁶	59.32 ²	46.5 ⁴	7.67 ¹	69.8 ⁹	14.59 ¹⁹	44.4
30.0	20.71 ²³	37.0 ³⁷	59.38 ⁶	46.3 ²	7.73 ⁶	68.8 ¹⁰	14.51 ⁸	40.7
May 10.0	20.68 ³	33.2 ³⁸	59.50 ¹²	46.3 ⁰	7.83 ¹⁰	67.5 ¹³	14.53 ²	37.0
19.9	20.84 ¹⁶	29.5 ³⁷	59.67 ¹⁷	46.5 ²	7.97 ¹⁴	66.0 ¹⁵	14.65 ¹²	33.3
29.9	21.19 ³⁵	26.0 ³⁵	59.88 ²¹	46.9 ⁴	8.16 ¹⁹	64.4 ¹⁶	14.87 ²²	29.7
June 8.9	21.73 ⁵⁴	22.7 ³³	60.13 ²⁵	47.6 ⁷	8.39 ²³	62.6 ¹⁸	15.19 ³²	26.2
18.9	22.43 ⁷⁶	19.7 ³⁰	60.41 ²⁸	48.6 ¹⁰	8.64 ²⁵	60.8 ¹⁸	15.59 ⁴⁰	23.1
28.8	23.29 ⁸⁰	17.1 ²⁶	60.72 ³¹	49.7 ¹¹	8.92 ²⁸	58.9 ¹⁹	16.07 ⁴⁸	20.3
July 8.8	24.27 ⁹⁸	14.9 ²²	61.04 ³²	51.0 ¹³	9.22 ³⁰	57.0 ¹⁹	16.62 ⁵⁵	17.9
18.8	25.35 ¹⁰⁸	13.2 ¹⁷	61.38 ³⁴	52.5 ¹⁵	9.53 ³¹	55.1 ¹⁹	17.21 ⁵⁹	16.0
28.8	26.49 ¹¹⁴	12.1 ¹¹	61.72 ³⁴	54.0 ¹⁵	9.85 ¹⁸	53.3 ¹⁸	17.83 ⁶²	14.6
Aug. 7.7	27.66 ¹¹⁷	11.6 ⁵	62.05 ³³	55.6 ¹⁶	10.16 ³¹	51.7 ¹⁶	18.47 ⁶⁴	13.8
17.7	28.83 ¹¹⁷	11.7 ¹	62.37 ³²	57.2 ¹⁶	10.46 ³⁰	50.3 ¹⁴	19.10 ⁶³	13.6
27.7	29.95 ¹¹²	12.4 ⁷	62.68 ³¹	58.8 ¹⁶	10.74 ²⁸	49.2 ¹¹	19.71 ⁶¹	14.1
Sept. 6.6	30.99 ¹⁰⁴	13.7 ¹³	62.96 ²⁸	60.4 ¹⁶	11.00 ²⁶	48.3 ⁹	20.28 ⁵⁷	15.2
16.6	31.92 ⁹³	15.5 ¹⁸	63.22 ²⁶	61.8 ¹⁴	11.24 ²⁴	47.7 ⁶	20.78 ⁵⁰	16.8
26.6	32.70 ⁷⁸	17.8 ²³	63.46 ²⁴	63.1 ¹³	11.46 ²²	47.3 ⁴	21.21 ⁴³	18.9
Oct. 6.6	33.30 ⁶⁰	20.5 ²⁷	63.66 ²⁰	64.3 ¹²	11.65 ¹⁹	47.3 ⁰	21.56 ³⁵	21.5
16.5	33.69 ³⁹	23.6 ³¹	63.84 ¹⁸	65.3 ¹⁰	11.81 ¹⁶	47.5 ²	21.81 ²⁵	24.4
26.5	33.88 ¹⁹	26.8 ³²	63.98 ¹⁴	66.2 ⁹	11.93 ¹²	47.8 ³	21.96 ¹⁵	27.5
Nov. 5.5	33.84 ⁴	30.0 ³²	64.09 ¹¹	66.2 ⁸	12.03 ¹⁰	48.4 ⁶	22.00 ⁴	30.8
15.5	33.57 ²⁷	33.3 ³³	64.17 ⁸	67.6 ⁶	12.10 ⁷	49.2 ⁸	21.93 ⁷	34.0
25.4	33.10 ⁴⁷	36.3 ³⁰	64.22 ⁵	68.0 ⁴	12.14 ⁴	50.0 ⁸	21.76 ¹⁷	37.1
Dec. 5.4	32.42 ⁶⁸	39.0 ²⁷	64.24 ²	68.3 ³	12.15 ¹	50.9 ⁹	21.49 ²⁷	40.0
15.4	31.57 ⁸⁵	41.3 ²³	64.22 ²	68.5 ²	12.13 ²	51.8 ⁹	21.14 ³⁵	42.5
25.3	30.57 ¹⁰⁰	43.1 ¹⁸	64.17 ⁵	68.5 ⁰	12.08 ⁵	52.7 ⁹	20.71 ⁴³	44.5
35.3	29.46 ¹¹¹	44.4 ¹³	64.10 ⁷	68.4 ¹	12.00 ⁸	53.5 ⁸	20.22 ⁴⁹	46.0
Sec δ , Tan δ	5.475	-5.383	1.076	+0.396	1.000	-0.001	2.744	-2.5
Mean Place	26 ^h .416	49 ^m .47	50 ^h .203	39 ^m .96	7 ^h .461	75 ^m .01	16 ^h .634	51 ^m .6
$D'\phi a$, $D_w a$	-0.00	+0.28	+0.01	-0.02	0.00	0.00	-0.04	+0.1
$D'\phi \delta$, $D_w \delta$	+0.3	+0.6	+0.3	+0.6	+0.3	+0.6	+0.3	+0.6

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	θ Persel. Mag. 4.2		γ Ceti seq. Mag. 3.7		π Ceti. Mag. 4.4		μ Ceti. Mag. 4.4	
	Right Ascension.	Declination N.	Right Ascension.	Declination N.	Right Ascension.	Declination S.	Right Ascension.	Declination N.
	h m 2 38	° ' + 48 52	h m 2 38	° ' + 2 52	h m 2 40	° ' - 14 12	h m 2 40	° ' + 9 45
	s "	"	s "	"	s "	"	s "	"
Jan. 0.3	24.55 ¹⁶	30.8	54.91 ⁹	48.4	5.90 ¹⁰	63.3	21.91 ⁹	30.6
10.3	24.39 ¹⁹	31.5 ⁷	54.82 ¹¹	47.7 ⁶	5.80 ¹²	64.4 ⁸	21.82 ¹⁰	30.0
20.3	24.20 ²²	31.9 ⁴	54.71 ¹²	47.1 ⁶	5.68 ¹⁴	65.2 ⁶	21.72 ¹²	29.5
30.3	23.98 ²³	31.8 ¹	54.59 ¹⁴	46.5 ⁵	5.54 ¹⁵	65.8 ³	21.60 ¹⁴	29.0
Feb. 9.2	23.75 ²⁴	31.3 ⁵	54.45 ¹⁴	46.0 ⁴	5.39 ¹⁵	66.1 ⁰	21.46 ¹⁴	28.5
19.2	23.51 ²²	30.5 ¹²	54.31 ¹³	45.6 ²	5.24 ¹⁵	66.1 ²	21.32 ¹³	28.0
Mar. 1.2	23.29 ²⁰	29.3 ¹⁷	54.18 ¹²	45.4 ¹	5.09 ¹³	65.9 ⁵	21.19 ¹²	27.6
11.1	23.09 ¹⁶	27.9 ¹⁴	54.06 ¹⁰	45.3 ¹	4.96 ¹¹	65.4 ⁹	21.07 ¹⁰	27.2
21.1	22.93 ¹¹	26.2 ¹⁸	53.96 ⁷	45.4 ²	4.85 ⁸	64.5 ¹¹	20.97 ⁷	27.0
31.1	22.82 ⁵	24.4 ¹⁹	53.89 ³	45.6 ⁵	4.77 ⁴	63.4 ¹³	20.90 ³	26.9
Apr. 10.1	22.77 ¹	22.5 ¹⁸	53.86 ¹	46.1 ⁶	4.73 ⁰	62.1 ¹⁷	20.87 ¹	27.0
20.0	22.78 ⁸	20.7 ¹⁸	53.87 ⁶	46.7 ⁹	4.73 ⁴	60.4 ¹⁸	20.88 ⁶	27.2
30.0	22.86 ¹⁴	18.9 ¹⁶	53.93 ¹⁰	47.6 ¹¹	4.77 ⁹	58.6 ²⁰	20.94 ¹⁰	27.7
May 10.0	23.00 ²¹	17.3 ¹³	54.03 ¹⁴	48.7 ¹³	4.86 ¹³	56.6 ²²	21.04 ¹⁵	28.4
20.0	23.21 ²⁷	16.0 ¹⁰	54.17 ¹⁹	50.0 ¹⁴	4.99 ¹⁷	54.4 ²³	21.19 ¹⁹	29.3
June 29.9	23.48 ³³	15.0 ⁷	54.36 ²²	51.4 ¹⁷	5.16 ²²	52.1 ²⁴	21.38 ²³	30.4
8.9	23.81 ³⁷	14.3 ⁴	54.58 ²⁵	53.1 ¹⁷	5.38 ²⁵	49.7 ²⁴	21.61 ²³	31.7
18.9	24.18 ⁴⁰	13.9 ¹	54.83 ²⁸	54.8 ¹⁸	5.63 ²⁷	47.3 ²⁴	21.87 ²⁶	33.1
28.8	24.58 ⁴³	14.0 ³	55.11 ³⁰	56.6 ¹⁸	5.90 ³⁰	45.0 ²³	22.16 ²⁹	34.6
July 8.8	25.01 ⁴⁴	14.3 ⁷	55.41 ³¹	58.4 ¹⁸	6.20 ³¹	42.8 ²¹	22.46 ³⁰	36.3
18.8	25.45 ⁴⁵	15.0 ¹¹	55.72 ³²	60.2 ¹⁷	6.51 ³¹	40.7 ¹⁸	22.78 ³²	38.0
28.8	25.90 ⁴⁵	16.1 ¹³	56.04 ³¹	61.9 ¹⁶	6.82 ³¹	38.9 ¹⁵	23.10 ³²	39.6
Aug. 7.7	26.35 ⁴⁴	17.4 ¹⁶	56.35 ³⁰	63.5 ¹⁴	7.13 ³¹	37.4 ¹²	23.42 ³¹	41.2
17.7	26.79 ⁴¹	19.0 ¹⁹	56.65 ²⁹	64.9 ¹²	7.44 ²⁹	36.2 ⁸	23.73 ²⁹	42.7
27.7	27.20 ³⁹	20.9 ²⁰	56.94 ²⁷	66.1 ¹⁰	7.73 ²⁶	35.4 ⁵	24.02 ²⁷	44.0
Sept. 6.7	27.59 ³⁶	22.9 ²²	57.21 ²⁴	67.1 ⁷	7.99 ²⁵	34.9 ¹	24.29 ²⁵	45.2
16.6	27.95 ³²	25.1 ²³	57.45 ²²	67.8 ⁵	8.24 ²²	34.8 ³	24.54 ²³	46.2
26.6	28.27 ²⁸	27.4 ²⁴	57.67 ¹⁹	68.3 ²	8.46 ¹⁹	35.1 ⁷	24.77 ²⁰	47.0
Oct. 6.6	28.55 ²⁴	29.8 ²³	57.86 ¹⁶	68.5 ³	8.65 ¹⁵	35.8 ¹²	24.97 ¹⁷	47.5
16.5	28.79 ²⁰	32.2 ²³	58.02 ¹⁴	68.5 ⁰	8.80 ¹³	36.8 ¹⁰	25.14 ¹⁴	47.9
Nov. 26.5	28.99 ¹⁵	34.5 ²³	58.16 ¹⁰	68.2 ⁴	8.93 ⁹	38.0 ¹⁴	25.28 ¹¹	48.0
5.5	29.14 ¹¹	36.8 ²²	58.26 ⁸	67.8 ⁶	9.02 ⁷	39.4 ¹⁶	25.39 ⁸	48.0
15.5	29.25 ⁵	39.0 ²⁰	58.34 ⁴	67.2 ⁶	9.09 ³	41.0 ¹⁶	25.47 ⁵	47.9
25.4	29.30 ¹	41.0 ¹⁸	58.38 ¹	66.6 ⁸	9.12 ⁰	42.6 ¹⁵	25.52 ²	47.6
Dec. 5.4	29.31 ⁴	42.8 ¹⁶	58.39 ²	65.8 ⁸	9.12 ³	44.2 ¹⁵	25.54 ¹	47.2
15.4	29.27 ⁹	44.4 ¹³	58.37 ⁴	65.0 ⁸	9.09 ⁶	45.7 ¹⁴	25.53 ⁴	46.8
25.4	29.18 ¹³	45.7 ⁹	58.33 ⁷	64.2 ⁷	9.03 ⁹	47.1 ¹²	25.49 ⁷	46.3
35.3	29.05 ¹³	46.6 ⁹	58.26 ⁷	63.5 ⁷	8.94 ⁹	48.3 ¹²	25.42 ⁷	45.7
Sec δ, Tan δ	1.520	+1.145	1.001	+0.050	1.032	-0.253	1.015	+0.172
Mean Place	23°.193	11''.05	53°.664	41''.43	4°.561	65''.18	20°.674	21''.47
$\Delta\alpha$, $\Delta\delta$	+0.02	-0.06	0.00	0.00	0.00	+0.01	0.00	-0.01
$\Delta\delta$, $\Delta\delta$	+0.3	+0.6	+0.3	+0.6	+0.3	+0.6	+0.3	+0.6

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	77 Persei. Mag. 3-9		41 Arietis. Mag. 3-7		β Fornacis. Mag. 4-5		σ Arietis. Mag. 5-5	
	Right Ascension.	Declination N.	Right Ascension.	Declination N.	Right Ascension.	Declination S.	Right Ascension.	Declination N.
	h m	° '	h m	° '	h m	° '	h m	° '
	2 44	+ 55 32	2 44	+ 26 54	2 45	- 32 45	2 46	+ 14 43
	s	"	s	"	s	"	s	"
Jan. 0.3	30.76	57.9	59.85	53.4	33.55	47.9	49.08	67.1
10.3	30.57 ¹⁹	58.9 ¹⁰	59.76 ⁹	53.4 ⁰	33.41 ¹⁴	49.2 ¹³	49.00 ⁸	66.7 ⁴
20.3	30.33 ²⁴	59.5 ⁶	59.64 ¹²	53.2 ²	33.25 ¹⁶	50.1 ⁹	48.89 ¹¹	66.3 ⁴
30.3	30.07 ²⁶	59.6 ¹	59.50 ¹⁴	52.8 ⁴	33.07 ¹⁸	50.7 ⁶	48.76 ¹³	65.8 ⁵
Feb. 9.2	29.78 ²⁹	59.3 ³	59.34 ¹⁶	52.3 ⁵	32.87 ²⁰	50.8 ¹	48.62 ¹⁴	65.3 ⁶
19.2	29.49	58.5	59.18	51.7	32.68	50.4	48.48	64.7
Mar. 1.2	29.22 ²⁷	57.3 ¹²	59.03 ¹⁵	50.9	32.49 ¹⁹	49.7 ⁷	48.34 ¹⁴	64.2 ⁵
11.1	28.97 ²⁵	55.8 ¹⁵	58.89 ¹⁴	50.0	32.32 ¹⁷	48.5 ¹²	48.21 ¹³	63.7 ⁵
21.1	28.77 ²⁰	54.0 ¹⁸	58.78 ¹¹	49.1	32.17 ¹⁵	46.9 ¹⁶	48.10 ¹¹	63.3 ⁴
31.1	28.62 ¹⁵	52.0 ²⁰	58.70 ⁸	48.2	32.06 ¹¹	45.0 ¹⁹	48.03 ⁷	62.9 ⁴
Apr. 10.1	28.54	49.9	58.66	47.3	31.98	42.8	48.00	62.7
20.0	28.53 ¹	47.8 ²¹	58.67 ¹	46.6	31.95 ³	40.3 ²⁵	48.00 ⁰	62.7
30.0	28.60 ⁷	45.7 ²¹	58.73 ⁶	46.0	31.96 ¹	37.6 ²⁷	48.05 ⁵	62.9
May 10.0	28.75 ¹⁵	43.8 ¹⁹	58.84 ¹¹	45.7	32.03 ⁷	34.7 ²⁹	48.15 ¹⁰	63.2
20.0	28.98 ²³	42.2 ¹⁶	59.00 ¹⁶	45.5	32.15 ¹²	31.7 ³⁰	48.30 ¹⁵	63.8
29.9	29.27	40.8	59.21	45.6	32.32	28.7	48.49	64.6
June 8.9	29.63 ³⁶	39.7 ¹¹	59.46 ²⁵	46.0	32.53 ²¹	25.7 ³⁰	48.72 ²³	65.6 ¹⁰
18.9	30.04 ⁴¹	39.0 ⁷	59.75 ²⁹	46.6	32.78 ²⁵	22.8 ²⁹	48.98 ²⁶	66.8 ¹²
28.8	30.49 ⁴⁵	38.7 ³	60.06 ³¹	47.5	33.06 ²⁸	20.0 ²⁸	49.27 ²⁹	68.1 ¹³
July 8.8	30.97 ⁴⁸	38.8 ¹	60.39 ³³	48.6	33.37 ³¹	17.5 ²⁵	49.58 ³¹	69.6 ¹⁵
18.8	31.47	39.2	60.74	49.8	33.70	15.3	49.90	71.1
28.8	31.98 ⁵¹	40.1 ⁹	61.09 ³⁵	51.2	34.03 ³³	13.5 ¹⁸	50.23 ³³	72.7 ¹⁶
Aug. 7.7	32.49 ⁵¹	41.3 ¹²	61.44 ³⁵	52.7	34.37 ³⁴	12.1 ¹⁴	50.55 ³²	74.2 ¹⁵
17.7	32.98 ⁴⁹	42.8 ¹⁵	61.78 ³⁴	54.2	34.70 ³³	11.2 ⁹	50.87 ³²	75.7 ¹⁵
27.7	33.46 ⁴⁸	44.6 ¹⁸	62.10 ³²	55.8	35.02 ³²	10.8 ⁴	51.17 ³⁰	77.1 ¹⁴
Sept. 6.7	33.90	46.6	62.40	57.4	35.32	10.9	51.45	78.4
16.6	34.32 ⁴²	48.9 ²³	62.68 ²⁸	58.9	35.59 ²⁷	11.5 ⁶	51.71 ²⁶	79.6 ¹²
26.6	34.69 ³⁷	51.3 ²⁴	62.93 ²⁵	60.4	35.83 ²⁴	12.5 ¹⁰	51.94 ²³	80.5 ⁹
Oct. 6.6	35.02 ³³	53.8 ²⁵	63.15 ²²	61.8	36.03 ²⁰	14.0 ¹⁵	52.15 ²¹	81.3 ⁶
16.5	35.30 ²⁸	56.4 ²⁶	63.35 ²⁰	63.1	36.20 ¹⁷	15.8 ¹⁸	52.33 ¹⁸	81.9 ⁴
26.5	35.53	59.1	63.51	64.3	36.33	18.0	52.48	82.3
Nov. 5.5	35.71 ¹⁸	61.7 ²⁶	63.64 ¹³	65.3	36.42 ⁹	20.3 ²³	52.60 ¹²	82.6 ³
15.5	35.84 ¹³	64.2 ²⁵	63.74 ¹⁰	66.2	36.47 ⁵	22.7 ²⁴	52.69 ⁹	82.8
25.4	35.90 ⁶	66.5 ²³	63.80 ⁶	66.9	36.48 ¹	25.2 ²⁵	52.75 ⁶	82.8
Dec. 5.4	35.91 ¹	68.7 ²²	63.82 ²	67.5	36.45 ³	27.5 ²³	52.78 ³	82.7
15.4	35.85	70.6	63.82	68.0	36.39	29.7	52.77	82.5
25.4	35.74 ¹¹	72.2 ¹⁶	63.78 ⁴	68.3	36.30 ⁹	31.6 ¹⁹	52.73 ⁴	82.2
35.3	35.58 ¹⁶	73.5 ¹³	63.70 ⁸	68.4	36.17 ¹³	33.2 ¹⁶	52.67 ⁶	81.9
Sec δ , Tan δ	1.768	+1.458	1.121	+0.508	1.189	-0.643	1.034	+0.263
Mean Place	29 ^m .228	36 ^m .93	58 ^m .582	39 ^m .24	31 ^m .992	44 ^m .94	47 ^m .812	56 ^m .45
D ψ α , D ω α	+0.03	-0.07	+0.01	-0.03	-0.01	+0.03	0.00	-0.01
D ψ δ , D ω δ	+0.3	+0.7	+0.3	+0.7	+0.3	+0.7	+0.3	+0.7

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	τ^2 Eridani. Mag. 4.8		τ Persel. Mag. 4.1		η Eridani. Mag. 4.0		ϵ Arietis (mean). Mag. 4.6	
	Right Ascension.	Declination S.	Right Ascension.	Declination N.	Right Ascension.	Declination S.	Right Ascension.	Declination N.
	h m 2 47	° ' " - 21 20	h m 2 48	° ' " + 52 24	h m 2 52	° ' " - 9 13	h m 2 54	° ' " + 21 0
Jan. 0.3	12.32 ^s	73.4 ^s	14.85 ^s	76.0 ^s	17.83 ^s	65.4 ^s	22.20 ^s	16.1 ^s
10.3	12.21 ¹¹	74.6 ¹²	14.68 ¹⁷	76.9 ⁹	17.74 ⁹	66.4 ¹⁰	22.12 ⁸	15.9 ²
20.3	12.08 ¹³	75.5 ⁹	14.47 ²¹	77.4 ⁵	17.63 ¹¹	67.3 ⁹	22.01 ¹¹	15.7 ²
30.3	11.93 ¹⁵	76.1 ⁶	14.23 ²⁴	77.5 ¹	17.50 ¹³	67.9 ⁶	21.88 ¹³	15.3 ⁴
Feb. 9.2	11.77 ¹⁶	76.4 ³	13.97 ²⁶	77.2 ³	17.36 ¹⁴	68.3 ⁴	21.73 ¹⁵	14.8 ⁵
19.2	11.60 ¹⁷	76.3 ¹	13.71 ²⁶	76.4 ⁸	17.21 ¹⁵	68.5 ²	21.58 ¹⁵	14.2 ⁶
Mar. 1.2	11.44 ¹⁶	75.9 ⁴	13.46 ²⁵	75.3 ¹¹	17.06 ¹⁵	68.4 ¹	21.43 ¹⁵	13.5 ⁷
11.2	11.30 ¹⁴	75.1 ⁸	13.23 ²³	73.9 ¹⁴	16.93 ¹³	68.1 ³	21.29 ¹⁴	12.9 ⁶
21.1	11.17 ¹³	74.0 ¹¹	13.04 ¹⁹	72.2 ¹⁷	16.82 ¹¹	67.6 ⁵	21.18 ¹¹	12.2 ⁷
31.1	11.08 ⁹	72.6 ¹⁴	12.91 ¹³	70.3 ¹⁹	16.73 ⁹	66.7 ⁹	21.10 ⁸	11.6 ⁶
Apr. 10.1	11.02 ⁶	71.0 ¹⁶	12.83 ⁸	68.4 ¹⁹	16.68 ⁵	65.7 ¹⁰	21.05 ⁵	11.1 ⁵
20.0	11.00 ²	69.0 ²⁰	12.82 ¹	66.4 ²⁰	16.67 ¹	64.4 ¹³	21.05 ⁰	10.7 ⁴
30.0	11.03 ³	66.8 ²²	12.88 ⁶	64.5 ¹⁹	16.70 ³	62.8 ¹⁶	21.10 ⁵	10.5 ²
May 10.0	11.10 ⁷	64.4 ²⁴	13.02 ¹⁴	62.7 ¹⁸	16.78 ⁸	61.1 ¹⁷	21.20 ¹⁰	10.5 ⁰
20.0	11.22 ¹²	61.9 ²⁵	13.23 ²¹	61.2 ¹⁵	16.90 ¹²	59.2 ¹⁹	21.34 ¹⁴	10.7 ²
29.9	11.39 ¹⁷	59.3 ²⁶	13.50 ²⁷	59.9 ¹³	17.07 ¹⁷	57.1 ²¹	21.53 ¹⁹	11.1 ⁴
June 8.9	11.60 ²¹	56.7 ²⁶	13.83 ³³	58.9 ¹⁰	17.28 ²¹	55.0 ²¹	21.76 ²³	11.7 ⁶
18.9	11.84 ²⁴	54.0 ²⁷	14.22 ³⁹	58.3 ⁶	17.52 ²⁴	52.8 ²²	22.03 ²⁷	12.5 ⁸
28.9	12.11 ²⁷	51.5 ²⁵	14.64 ⁴²	58.1 ²	17.78 ²⁶	50.6 ²²	22.33 ³⁰	13.6 ¹¹
July 8.8	12.41 ³⁰	49.2 ²³	15.09 ⁴⁵	58.3 ²	18.07 ²⁹	48.5 ²¹	22.64 ³¹	14.8 ¹²
18.8	12.72 ³¹	47.1 ²¹	15.56 ⁴⁷	58.8 ⁵	18.38 ³¹	46.5 ²⁰	22.97 ³³	14.8 ¹³
28.8	13.04 ³²	45.2 ¹⁹	16.04 ⁴⁸	59.6 ⁸	18.69 ³¹	44.7 ¹⁸	23.31 ³⁴	16.1 ¹⁴
Aug. 7.7	13.35 ³¹	43.7 ¹⁵	16.52 ⁴⁸	60.8 ¹²	19.00 ³¹	43.2 ¹⁵	23.64 ³³	17.5 ¹⁴
17.7	13.66 ³¹	42.6 ¹¹	16.98 ⁴⁶	62.3 ¹⁵	19.30 ³⁰	41.9 ¹³	23.97 ³³	19.0 ¹⁵
27.7	13.96 ³⁰	41.9 ⁷	17.43 ⁴⁵	64.0 ¹⁷	19.59 ²⁹	40.9 ¹⁰	24.28 ³¹	20.5 ¹⁵
6.7	14.24 ²⁸	41.7 ²	17.85 ⁴²	66.0 ²⁰	19.86 ²⁷	40.9 ⁶	24.58 ³⁰	21.9 ¹⁴
Sept. 16.6	14.49 ²⁵	41.9 ²	18.24 ³⁹	68.2 ²²	20.12 ²⁶	40.3 ²	24.85 ²⁷	23.3 ¹³
26.6	14.72 ²³	42.5 ⁶	18.60 ³⁶	70.5 ²³	20.34 ²²	40.1 ¹	25.10 ²⁵	24.6 ¹³
Oct. 6.6	14.92 ²⁰	43.5 ¹⁰	18.91 ³¹	72.9 ²⁴	20.54 ²⁰	40.2 ¹	25.10 ²⁵	25.8 ¹²
16.5	15.08 ¹⁶	44.8 ¹³	19.18 ²⁷	75.3 ²⁴	20.71 ¹⁷	40.6 ⁴	25.32 ²²	26.9 ¹¹
26.5	15.21 ¹³	46.4 ¹⁶	19.41 ²³	77.8 ²⁵	20.85 ¹⁴	41.3 ⁷	25.52 ²⁰	27.8 ⁹
Nov. 5.5	15.21 ¹⁰	46.4 ¹⁸	19.41 ¹⁷	77.8 ²⁴	20.85 ¹¹	42.3 ¹²	25.68 ¹⁴	28.6 ⁶
15.5	15.31 ⁷	48.2 ¹⁸	19.58 ¹⁷	80.2 ²⁴	20.96 ¹¹	43.5 ¹²	25.82 ¹⁴	29.2 ⁶
25.4	15.38 ³	50.1 ¹⁹	19.71 ¹³	82.6 ²⁴	21.04 ⁸	44.8 ¹³	25.92 ¹⁰	29.7 ⁵
Dec. 5.4	15.41 ¹	52.1 ²⁰	19.78 ⁷	84.8 ²²	21.09 ⁵	46.2 ¹⁴	25.99 ⁷	30.1 ⁴
15.4	15.40 ⁴	54.1 ¹⁸	19.80 ²	86.8 ²⁰	21.10 ¹	47.6 ¹⁴	26.02 ³	30.4 ³
25.4	15.36 ⁶	55.9 ¹⁷	19.76 ⁴	88.6 ¹⁸	21.09 ¹	49.0 ¹⁴	26.03 ¹	30.4 ¹
35.3	15.30 ¹⁰	57.6 ¹⁴	19.67 ⁹	90.1 ¹⁵	21.04 ⁵	50.3 ¹³	26.00 ³	30.5 ⁰
	15.20 ¹⁴	59.0 ¹⁴	19.53 ¹⁴	91.2 ¹¹	20.97 ⁷	51.4 ¹¹	25.93 ⁷	30.5 ⁰
Sec δ, Tan δ	1.074	-0.391	1.640	+1.299	1.013	-0.163	1.071	+0.384
Mean Place	10 ^h .893	73 ^m .46	13 ^h .337	55 ^m .69	16 ^h .469	68 ^m .95	20 ^h .884	3 ^m .66
Dϕ α, Dα α	-0.01	+0.02	+0.02	-0.06	0.00	+0.01	+0.01	-0.02
Dϕ δ, Dα δ	+0.3	+0.7	+0.3	+0.7	+0.3	+0.7	+0.3	+0.7

[Eph 13]

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	47 H. Cephei. Mag. 5.7		θ Eridani. Mag. 3.4		α Ceti. Mag. 2.8		γ Persel. Mag. 3.1	
	Right Ascension.	Declination N.	Right Ascension.	Declination S.	Right Ascension.	Declination N.	Right Ascension.	Declination S.
	h m 2 54	° ' " +79 5	h m 2 55	° ' " -40 38	h m 2 57	° ' " + 3 45	h m 2 58	° ' " - 1 15
Jan. 0.3	47.60	27.4	4.15	45.6	51.39	32.3	39.53	
10.3	46.85 ⁷⁵	29.2 ¹⁸	3.98 ¹⁷	47.1 ¹⁵	51.31 ⁸	31.6 ⁷	39.36 ¹⁷	
20.3	45.97 ⁸⁸	30.6 ¹⁴	3.78 ²⁰	48.1 ¹⁰	51.21 ¹⁰	30.9 ⁷	39.15 ²¹	
30.3	45.00 ⁹⁷	31.3 ⁷	3.57 ²¹	48.7 ⁶	51.09 ¹²	30.4 ⁵	38.91 ²⁴	
Feb. 9.2	43.98 ¹⁰²	31.4 ⁵	3.34 ²³	48.8 ⁴	50.95 ¹⁴	29.9 ⁵	38.65 ²⁶	
19.2	42.96 ¹⁰²	30.9 ¹⁰	3.11 ²³	48.4 ⁹	50.81 ¹⁴	29.5 ³	38.38 ²⁷	
Mar. 1.2	41.99 ⁸⁹	29.9 ¹⁶	2.88 ²¹	47.5 ¹⁴	50.67 ¹³	29.2 ¹	38.11 ²⁷	
11.2	41.10 ⁷⁵	28.3 ²⁰	2.67 ¹⁸	46.1 ¹⁷	50.54 ¹¹	29.1 ⁰	37.87 ²⁰	
21.1	40.35 ⁶⁰	26.3 ²⁴	2.49 ¹⁵	44.4 ²¹	50.43 ⁸	29.1 ²	37.67 ¹⁵	
31.1	39.75 ⁴⁰	23.9 ²⁷	2.34 ¹¹	42.3 ²⁵	50.35 ⁵	29.3 ⁴	37.52 ¹⁰	
Apr. 10.1	39.35 ¹⁹	21.2 ²⁸	2.23 ⁶	39.8 ²⁷	50.30 ¹	29.7 ⁶	37.42 ²	
20.0	39.16 ³	18.4 ²⁹	2.17 ⁰	37.1 ³⁰	50.29 ⁴	30.3 ⁸	37.40 ⁵	
May 10.0	39.19 ²⁴	15.5 ²⁸	2.17 ⁴	34.1 ³²	50.33 ⁸	31.1 ⁹	37.45 ¹²	
20.0	39.43 ⁴⁶	12.7 ²⁷	2.21 ¹⁰	30.9 ³³	50.41 ¹³	32.0 ¹²	37.57 ¹⁹	
29.9	39.89 ⁶⁶	10.0 ²⁴	2.31 ¹⁶	27.7 ³³	50.54 ¹⁷	33.2 ¹⁴	37.76 ²⁶	
June 8.9	40.55 ⁸⁴	7.6 ²⁰	2.47 ²⁰	24.4 ³²	50.71 ²¹	34.6 ¹⁵	38.02 ³³	
18.9	41.39 ¹⁰⁰	5.6 ¹⁷	2.67 ²⁵	21.2 ³¹	50.92 ²⁴	36.1 ¹⁶	38.35 ³⁸	
28.9	42.39 ¹¹²	3.9 ¹³	2.92 ²⁹	18.1 ²⁹	51.16 ²⁷	37.7 ¹⁸	38.73 ⁴²	
July 8.8	43.51 ¹²³	2.6 ⁸	3.21 ³²	15.2 ²⁶	51.43 ²⁹	39.4 ¹⁸	39.15 ⁴⁵	
18.8	44.74 ¹³⁰	1.8 ³	3.53 ³⁴	12.6 ²²	51.72 ³¹	41.2 ¹⁸	39.60 ⁴⁷	
28.8	46.04 ¹³³	1.5 ²	3.87 ³⁶	10.4 ¹⁹	52.03 ³¹	43.0 ¹⁶	40.07 ⁴⁹	
Aug. 7.7	47.37 ¹³⁵	1.7 ⁶	4.23 ³⁶	8.5 ¹³	52.34 ³¹	44.6 ¹⁶	40.56 ⁴⁹	
17.7	48.72 ¹³⁴	2.3 ¹²	4.59 ³⁵	7.2 ⁹	52.65 ³¹	46.2 ¹⁴	41.05 ⁴⁷	
27.7	50.06 ¹³⁰	3.5 ¹⁵	4.94 ³⁵	6.3 ³	52.96 ²⁹	47.6 ¹¹	41.52 ⁴⁶	
Sept. 6.7	51.36 ¹²⁴	5.0 ²⁰	5.29 ³²	6.0 ³	53.25 ²⁸	48.7 ¹⁰	41.98 ⁴⁴	
16.6	52.60 ¹¹⁶	7.0 ²⁴	5.61 ²⁹	6.3 ⁷	53.53 ²⁶	49.7 ⁷	42.42 ⁴¹	
26.6	53.76 ¹⁰⁵	9.4 ²⁷	5.90 ²⁷	7.0 ¹³	53.79 ²³	50.4 ⁵	42.83 ³⁷	
Oct. 6.6	54.81 ⁹²	12.1 ²⁹	6.17 ²²	8.3 ¹⁸	54.02 ²¹	50.9 ²	43.20 ³⁴	
16.6	55.73 ⁷⁸	15.0 ³²	6.39 ¹⁹	10.1 ²²	54.23 ¹⁸	51.1 ⁰	43.54 ²⁹	
26.5	56.51 ⁶³	18.2 ³³	6.58 ¹⁴	12.3 ²⁴	54.41 ¹⁵	51.1 ²	43.83 ²⁴	
Nov. 5.5	57.14 ⁴⁶	21.5 ³⁵	6.72 ¹⁰	14.7 ²⁶	54.56 ¹²	50.9 ⁵	44.07 ²⁰	
15.5	57.60 ²⁷	25.0 ³⁴	6.82 ⁵	17.3 ²⁸	54.68 ¹⁰	50.4 ⁶	44.27 ¹⁴	
25.4	57.87 ¹¹	28.4 ³²	6.87 ³	20.1 ²⁶	54.78 ⁶	49.8 ⁸	44.41 ⁹	
Dec. 5.4	57.94 ³¹	31.7 ²⁹	6.87 ⁸	22.9 ²⁴	54.84 ³	49.2 ⁸	44.50 ³	
15.4	57.83 ⁴⁹	34.9 ²⁶	6.84 ¹²	25.5 ²¹	54.87 ³	48.4 ⁷	44.54 ⁸	
25.4	57.52 ⁶⁷	37.8 ²²	6.76 ¹⁵	27.9 ¹⁸	54.87 ⁶	47.6 ⁸	44.51 ¹³	
35.3	57.03	40.4	6.64	30.0	54.84	46.9	44.43	
	56.36	42.6	6.49	31.8	54.78	46.1	44.30	
Sec δ , Tan δ	5.283	+5.188	1.318	-0.858	1.002	+0.066	1.669	
Mean Place	43° 49.04	3' 53"	2° 41.11	41' 34"	50° 05.6	24' 85"	37° 87.9	
D ψ α , D ω α	+0.09	-0.25	-0.02	+0.04	0.00	0.00	+0.02	
D ψ δ , D ω δ	+0.3	+0.7	+0.3	+0.7	+0.3	+0.7	+0.3	

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	τ^3 Eridani. Mag. 4.2		ρ Persei. Var. 3.4-4.2		μ Horologii. Mag. 5.2		θ Hydr. Mag. 5.5	
	Right Ascension.	Declination S.	Right Ascension.	Declination N.	Right Ascension.	Declination S.	Right Ascension.	Declination S.
	h m 2 58	° ' " -23 56	h m 2 59	° ' " +38 30	h m 3 1	° ' " -60 3	h m 3 2	° ' " -72 13
Jan. 0.3	40.16	85.4	44.89	58.7	38.84	68.1	7.88	72.1
10.3	40.05	86.8	44.78	59.2	38.51	69.6	7.25	73.5
20.3	39.91	87.8	44.64	59.4	38.14	70.6	6.57	74.3
30.3	39.76	88.5	44.48	59.4	37.75	71.0	5.86	74.6
Feb. 9.2	39.59	88.8	44.29	59.0	37.34	70.9	5.13	74.2
19.2	39.41	88.8	44.10	58.4	36.93	70.2	4.40	73.3
Mar. 1.2	39.24	88.4	43.91	57.5	36.54	68.9	3.70	71.9
11.2	39.08	87.6	43.74	56.4	36.17	67.2	3.05	69.9
21.1	38.94	86.4	43.59	55.2	35.84	65.0	2.46	67.5
31.1	38.83	85.0	43.48	53.9	35.55	62.4	1.94	64.7
Apr. 10.1	38.76	83.2	43.42	52.5	35.33	59.4	1.52	61.5
20.0	38.73	81.2	43.41	51.2	35.17	56.2	1.21	58.1
30.0	38.74	78.9	43.46	49.9	35.09	52.7	1.01	54.5
May 10.0	38.80	76.4	43.56	48.9	35.08	49.1	0.93	50.9
20.0	38.91	73.8	43.72	48.0	35.15	45.5	0.97	47.2
29.9	39.06	71.1	43.94	47.4	35.30	41.9	1.14	43.5
June 8.9	39.26	68.4	44.20	47.1	35.53	38.4	1.42	40.0
18.9	39.49	65.7	44.51	47.0	35.82	35.1	1.82	36.8
28.9	39.76	63.1	44.85	47.3	36.17	32.1	2.31	33.8
July 8.8	40.05	60.7	45.22	47.8	36.57	29.4	2.89	31.2
18.8	40.36	58.5	45.60	48.6	37.02	27.2	3.54	29.2
28.8	40.67	56.6	45.99	49.6	37.49	25.5	4.23	27.6
Aug. 7.7	40.99	55.1	46.38	50.9	37.98	24.3	4.96	26.6
17.7	41.31	54.0	46.76	52.3	38.46	23.7	5.70	26.2
27.7	41.61	53.3	47.12	53.9	38.94	23.7	6.42	26.4
Sept. 6.7	41.90	53.1	47.47	55.5	39.39	24.4	7.11	27.3
16.6	42.16	53.3	47.80	57.3	39.80	25.6	7.74	28.7
26.6	42.40	54.0	48.10	59.1	40.17	27.4	8.29	30.7
Oct. 6.6	42.61	55.1	48.36	60.8	40.48	29.6	8.75	33.2
16.6	42.79	56.5	48.60	62.6	40.72	32.3	9.10	36.0
26.5	42.93	58.2	48.80	64.3	40.89	35.3	9.33	39.1
Nov. 5.5	43.04	60.2	48.96	66.0	40.99	38.4	9.43	42.4
15.5	43.11	62.3	49.09	67.6	41.01	41.7	9.40	45.8
25.4	43.15	64.5	49.17	69.0	40.96	44.9	9.24	49.0
Dec. 5.4	43.15	66.6	49.21	70.3	40.84	47.9	8.95	52.0
15.4	43.12	68.6	49.21	71.4	40.65	50.6	8.55	54.7
25.4	43.05	70.4	49.17	72.2	40.40	53.0	8.06	57.0
35.3	42.96	71.9	49.09	72.9	40.09	54.9	7.47	58.8
Sec. δ , Tan δ	1.094	-0.444	1.278	+0.796	2.004	-1.736	3.277	-3.120
Mean Place	38°.655	85°'.18	43°.446	41°'.80	36°.362	60°'.91	4°.123	63°'.81
$\Delta\alpha$, $\Delta\delta$	-0.01	+0.02	+0.01	-0.04	-0.03	+0.08	-0.06	+0.15
$\Delta\alpha$, $\Delta\delta$	+0.3	+0.7	+0.3	+0.7	+0.3	+0.7	+0.3	+0.7

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	β Persei. (Algol.) Var. 2.1-3.2			δ Arietis. Mag. 4.5			12 Eridani. Mag. 4.0			48 H. Cephei. Mag. 5.5		
	Right Ascension.		Declination N.	Right Ascension.		Declination N.	Right Ascension.		Declination S.	Right Ascension.		Declination N.
	h m	s	° '	h m	s	° '	h m	s	° '	h m	s	° '
	3	2	+40 37	3	6	+19 24	3	8	-29 18	3	9	+77 25
Jan. 0.4	39.42		61.8	47.32		33.6	29.17		79.2	33.12		49.5
10.3	39.31	11	62.4 6	47.25	7	33.4 2	29.05	12	80.7 15	32.52	60	51.5 20
20.3	39.16	15	62.7 3	47.14	11	33.1 3	28.90	15	81.8 11	31.80	72	52.9 14
30.3	38.99	17	62.7 0	47.02	12	32.7 4	28.73	17	82.6 8	30.99	81	53.8 9
Feb. 9.2	38.80	19	62.4 3	46.88	14	32.3 4	28.55	18	82.9 3	30.13	86	54.1 3
		20	6		16	5		19	1		88	
19.2	38.60		61.8	46.72		31.8	28.36		82.8	29.25		53.8
Mar. 1.2	38.40	20	60.9 9	46.57	15	31.2 6	28.17	19	82.3 5	28.39	86	52.9
11.2	38.22	18	59.8 11	46.43	14	30.6 6	27.99	18	81.4 9	27.60	79	51.5 1
21.1	38.07	15	58.5 13	46.31	12	30.1 5	27.84	15	80.1 13	26.92	68	49.6 1
31.1	37.95	12	57.1 14	46.22	9	29.6 5	27.71	13	78.5 16	26.36	56	47.3 2
		7			6	5		9	19		40	
Apr. 10.1	37.88		55.7	46.16		29.1	27.62		76.6	25.96		44.8
20.1	37.87	1	54.3 14	46.15	1	28.8 3	27.56	6	74.3 23	25.75	21	42.0
30.0	37.91	4	52.9 14	46.18	3	28.7 1	27.56	0	71.8 25	25.72	3	39.2
May 10.0	38.02	11	51.7 12	46.27	9	28.7 0	27.60	4	69.1 27	25.89	17	36.4
20.0	38.18	16	50.8 8	46.40	13	28.9 2	27.70	10	66.3 28	26.25	36	33.8
		22			18	5		14	29		53	
29.9	38.40		50.0	46.58		29.4	27.84		63.4	26.78		31.3
June 8.9	38.66	26	49.5 5	46.80	22	30.1 7	28.03	19	60.5 29	27.48	70	29.2
18.9	38.97	31	49.4 1	47.05	25	30.9 8	28.26	23	57.6 29	28.32	84	27.4
28.9	39.32	35	49.5 1	47.34	29	32.0 11	28.52	26	54.8 28	29.28	96	26.0
July 8.8	39.69	37	49.9 4	47.65	31	33.1 11	28.81	29	52.3 25	30.33	105	25.1
		39	7		32	13		31	23		113	
18.8	40.08		50.6	47.97		34.4	29.12		50.0	31.46		24.6
28.8	40.48	40	51.6 10	48.30	33	35.8 14	29.44	32	48.0 20	32.64	118	24.6
Aug. 7.8	40.88	40	52.7 11	48.63	33	37.2 14	29.77	33	46.5 15	33.83	119	25.0
17.7	41.27	39	54.1 14	48.96	33	38.6 14	30.10	33	45.3 12	35.02	119	25.9
27.7	41.65	38	55.7 16	49.28	32	40.0 14	30.41	31	44.7 6	36.19	117	27.3
		36	17		30	13		30	2		112	
Sept. 6.7	42.01		57.4	49.58		41.3	30.71		44.5	37.31		29.1
16.6	42.34	33	59.1 17	49.85	27	42.5 12	30.99	28	44.9 4	38.37	106	31.2
26.6	42.65	31	61.0 19	50.11	26	43.5 10	31.24	25	45.7 8	39.34	97	33.7
Oct. 6.6	42.93	28	62.8 18	50.34	23	44.5 10	31.47	23	47.0 13	40.21	87	36.5
16.6	43.17	24	64.7 19	50.55	21	45.3 8	31.66	19	48.6 16	40.96	75	39.5
		21	18		17	6		15	20		62	
26.5	43.38		66.5	50.72		45.9	31.81		50.6	41.58		42.7
Nov. 5.5	43.55	17	68.3 18	50.87	15	46.4 5	31.93	12	52.8 22	42.06	48	46.0
15.5	43.69	14	70.0 17	50.98	11	46.8 4	32.01	8	55.1 23	42.38	32	49.3
25.5	43.78	9	71.5 15	51.06	8	47.0 2	32.05	4	57.5 24	42.54	16	52.6
Dec. 5.4	43.82	4	72.9 14	51.11	5	47.2 2	32.05	0	59.9 24	42.52	2	55.8
		0	12		1	0		3	22		19	
15.4	43.82		74.1	51.12		47.2	32.02		62.1	42.33		58.7
25.4	43.78	4	75.1 10	51.10	2	47.2 0	31.95	7	64.1 20	41.97	36	61.3
35.3	43.70	8	75.9 8	51.05	5	47.0 2	31.84	11	65.8 17	41.46	51	63.6
Sec δ , Tan δ	1.318		+0.858	1.060		+0.352	1.147		-0.562	4.595		+4.484
Mean Place	37°.936		44''.41	45°.936		21''.70	27°.562		78''.00	29°.353		26''.39
D ψ α , D ω α	+0.02		-0.04	+0.01		-0.02	-0.01		+0.03	+0.09		-0.20
D ψ δ , D ω δ	+0.3		+0.7	+0.3		+0.7	+0.3		+0.7	+0.3		+0.7

[Eph 13]

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	ζ Arietis. Mag. 5.0		38 Horologii (G.). Mag. 5.7		ζ Eridani. Mag. 4.9		τ Arietis. Mag. 5.2	
	Right Ascension.	Declination N.	Right Ascension.	Declination S.	Right Ascension.	Declination S.	Right Ascension.	Declination N.
	h m 3 10	° ' " +20 43	h m 3 10	° ' " -57 37	h m 3 11	° ' " -9 7	h m 3 16	° ' " +20 50
Jan. 0.4	2.15	60.6	26.15	89.0	43.65	61.1	20.45	41.0
10.3	2.08 7	60.4 2	25.86 20	90.6 16	43.57 8	62.2 11	20.38 7	40.8 2
20.3	1.97 11	60.2 2	25.53 33	91.8 12	43.47 10	63.1 9	20.28 10	40.6 2
30.3	1.84 13	59.9 3	25.17 36	92.4 6	43.34 13	63.8 7	20.16 12	40.3 3
Feb. 9.2	1.70 14	59.4 5	24.79 38	92.4 0	43.19 15	64.3 5	20.01 15	39.9 4
19.2	1.55 15	58.9 5	24.41 38	91.9 5	43.04 15	64.6 3	19.86 15	39.4 5
Mar. 1.2	1.39 16	58.3 6	24.04 37	90.8 11	42.89 15	64.6 0	19.70 16	38.9 5
11.2	1.25 14	57.7 6	23.69 35	89.2 16	42.74 15	64.3 3	19.56 14	38.3 6
21.1	1.12 13	57.1 6	23.38 31	87.1 21	42.62 12	63.8 5	19.43 13	37.7 6
31.1	1.03 9	56.6 5	23.11 27	84.6 25	42.52 10	63.0 8	19.33 10	37.2 5
Apr. 10.1	0.97 6	56.1 5	22.83 22	81.8 28	42.45 7	62.0 10	19.26 7	36.7 5
20.1	0.96 1	55.7 4	22.73 16	78.7 31	42.42 3	60.8 12	19.24 2	36.3 4
30.0	0.99 3	55.5 2	22.65 8	75.3 34	42.43 1	59.3 15	19.27 3	36.0 3
May 10.0	1.07 8	55.4 1	22.63 2	71.8 35	42.49 6	57.6 17	19.34 7	36.0 0
20.0	1.20 13	55.6 2	22.69 6	68.2 36	42.60 11	55.8 18	19.46 12	36.1 1
29.9	1.37 17	55.9 3	22.82 13	64.6 36	42.74 14	53.8 20	19.63 17	36.4 3
June 8.9	1.59 22	55.9 6	22.82 20	61.1 35	42.74 19	51.7 21	19.63 22	36.4 6
18.9	1.59 26	56.5 8	23.02 20	61.1 35	42.93 19	51.7 21	19.85 22	37.0 6
28.9	1.85 28	57.3 9	23.29 27	57.8 33	43.16 23	49.5 22	20.10 25	37.7 7
July 8.8	2.13 31	58.2 11	23.62 33	54.7 31	43.41 25	47.3 22	20.38 28	38.6 9
18.8	2.44 32	59.3 13	24.00 41	52.0 23	43.69 30	45.2 20	20.69 32	39.7 12
28.8	2.76 34	60.6 13	24.41 44	49.7 19	43.99 30	43.2 18	21.01 33	40.9 13
Aug. 7.8	3.10 33	61.9 13	24.85 46	47.8 13	44.29 31	41.4 16	21.34 34	42.2 13
17.7	3.43 33	63.2 14	25.31 46	46.5 7	44.60 31	39.8 13	21.68 34	43.5 13
27.7	3.76 32	64.6 14	25.77 45	45.8 1	44.91 31	38.5 9	22.01 33	44.8 13
Sept. 6.7	4.08 30	66.0 13	26.22 43	45.7 5	45.20 28	37.6 7	22.33 30	46.2 12
16.6	4.38 28	67.3 12	26.65 40	46.2 11	45.48 26	36.9 3	22.63 29	47.4 12
26.6	4.66 26	68.5 11	27.05 36	47.3 16	45.74 24	36.6 1	22.92 27	48.6 10
Oct. 6.6	4.92 24	69.6 10	27.41 31	48.9 22	45.98 22	36.7 4	23.19 24	49.6 8
16.6	5.16 21	70.6 8	27.72 24	51.1 26	46.20 19	37.1 7	23.43 21	50.6 8
26.5	5.37 18	71.4 7	27.96 19	53.7 29	46.39 15	37.8 10	23.64 19	51.4 7
Nov. 5.5	5.55 15	72.1 5	28.15 11	56.6 31	46.54 13	38.8 12	23.83 16	52.1 5
15.5	5.70 12	72.6 5	28.26 5	59.7 32	46.67 10	40.0 14	23.99 12	52.6 5
25.5	5.82 9	73.1 3	28.31 5	62.9 32	46.77 7	41.4 14	24.11 9	53.1 3
Dec. 5.4	5.91 5	73.4 2	28.28 3	66.1 31	46.84 3	42.8 15	24.20 6	53.4 2
15.4	5.96 1	73.6 2	28.19 16	69.2 28	46.87 0	44.3 15	24.26 2	53.6 1
25.4	5.97 2	73.8 0	28.03 21	72.0 24	46.87 3	45.8 13	24.28 1	53.7 0
35.3	5.95 5	73.8 1	27.82 27	74.4 20	46.84 6	47.1 13	24.27 5	53.7 0
	5.90	73.7	27.55	76.4	46.78	48.4	24.22	53.7
See δ, Tan δ	1.069	+0.379	1.868	-1.578	1.013	-0.161	1.070	+0.381
Mean Place	0°.743	48''.35	23°.763	82''.62	42°.203	65''.10	19°.010	28''.80
Δα, Δα δ	+0.01	-0.02	-0.03	+0.07	0.00	+0.01	+0.01	-0.02
Δδ, Δδ δ	+0.3	+0.7	+0.3	+0.7	+0.3	+0.7	+0.3	+0.8

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	<i>e</i> Eridani. Mag. 4.3		<i>z</i> Hydri. Mag. 5.5		<i>α</i> Persel. Mag. 1.9		<i>ο</i> Tauri. Mag. 3.2
	Right Ascension.	Declination S.	Right Ascension.	Declination S.	Right Ascension.	Declination N.	Right Ascension.
	h m 3 16	° ' " -43 23	h m 3 17	° ' " -77 41	h m 3 18	° ' " +49 33	h m 3 20
Jan. 0.4	33.86 ^s	43.1 ["]	68.48 ^s	65.3 ["]	16.56 ^s	53.3 ["]	15.65 ^s
10.3	33.69 ¹⁷	44.8 ¹⁷	67.55 ⁹³	66.9 ¹⁶	16.44 ¹²	54.4 ¹¹	15.59 ⁶
20.3	33.49 ²⁰	46.1 ¹³	66.54 ¹⁰¹	67.9 ¹⁰	16.27 ¹⁷	55.1 ⁷	15.50 ⁹
30.3	33.27 ²²	46.9 ⁸	65.47 ¹⁰⁷	68.3 ⁴	16.06 ²¹	55.4 ³	15.38 ¹²
Feb. 9.3	33.03 ²⁵	47.1 ²	64.37 ¹¹⁰	68.1 ²	15.83 ²³	55.3 ¹	15.24 ¹⁴
19.2	32.78 ²⁵	46.9 ²	63.27 ¹¹⁰	67.4 ⁷	15.58 ²⁵	54.9 ⁴	15.09 ¹⁵
Mar 1.2	32.54 ²⁴	46.2 ⁷	62.20 ¹⁰⁷	66.1 ¹³	15.33 ²⁵	54.1 ⁸	14.94 ¹⁵
11.2	32.31 ²³	45.0 ¹²	61.19 ¹⁰¹	64.2 ¹⁹	15.10 ²³	52.9 ¹²	14.80 ¹⁴
21.1	32.10 ²¹	43.3 ¹⁷	60.26 ⁹³	62.0 ²²	14.90 ²⁰	51.5 ¹⁴	14.68 ¹²
31.1	31.92 ¹⁸	41.3 ²⁰	59.43 ⁸³	59.3 ²⁷	14.74 ¹⁶	50.0 ¹⁵	14.58 ¹⁰
Apr. 10.1	31.79 ¹³	38.9 ²⁴	58.73 ⁷⁰	56.2 ³¹	14.63 ¹¹	48.2 ¹⁸	14.51 ⁷
20.1	31.70 ⁹	36.1 ²⁸	58.18 ⁵⁵	53.0 ³²	14.59 ⁴	46.4 ¹⁸	14.49 ²
30.0	31.66 ⁴	33.1 ³⁰	57.78 ⁴⁰	49.5 ³⁵	14.61 ²	44.7 ¹⁷	14.50 ¹
May 10.0	31.68 ²	30.0 ³¹	57.54 ²⁴	45.9 ³⁶	14.70 ⁹	43.0 ¹⁷	14.57 ⁷
20.0	31.76 ⁸	26.7 ³³	57.48 ⁶	42.2 ³⁷	14.86 ¹⁶	41.5 ¹⁵	14.68 ¹¹
30.0	31.89 ¹³	23.3 ³⁴	57.60 ¹²	38.6 ³⁶	15.08 ²²	40.2 ¹³	14.83 ¹⁵
June 8.9	32.08 ¹⁹	20.0 ³³	57.88 ²⁸	35.1 ³⁵	15.36 ²⁸	39.2 ¹⁰	15.03 ²⁰
18.9	32.32 ²⁴	16.8 ³²	58.32 ⁴⁴	31.8 ³³	15.70 ³⁴	38.4 ⁸	15.26 ²³
28.9	32.60 ²⁸	13.8 ³⁰	58.92 ⁶⁰	28.8 ³⁰	16.08 ³⁸	38.0 ⁴	15.52 ²⁶
July 8.8	32.92 ³⁴	11.0 ²⁴	59.64 ⁸⁴	26.2 ²²	16.49 ⁴¹	38.0 ²	15.81 ²⁹
18.8	33.26 ³⁶	8.6 ²⁰	60.48 ⁹³	24.0 ¹⁶	16.92 ⁴⁵	38.2 ⁵	16.11 ³¹
28.8	33.62 ³⁸	6.6 ¹⁶	61.41 ⁹⁸	22.4 ¹¹	17.37 ⁴⁶	38.7 ⁹	16.42 ³²
Aug. 7.8	34.00 ³⁷	5.0 ¹⁰	62.39 ¹⁰¹	21.3 ⁵	17.83 ⁴⁵	39.6 ¹¹	16.74 ³¹
17.7	34.37 ³⁷	4.0 ⁴	63.40 ¹⁰¹	20.8 ¹	18.28 ⁴⁴	40.7 ¹⁴	17.05 ³⁰
27.7	34.74 ³⁵	3.6 ¹	64.41 ⁹⁸	20.9 ⁷	18.72 ⁴³	42.1 ¹⁶	17.35 ²⁹
Sept. 6.7	35.09 ³³	3.7 ⁷	65.39 ⁹⁰	21.6 ¹³	19.15 ⁴⁰	43.7 ¹⁸	17.64 ²⁷
16.7	35.42 ²⁹	4.4 ¹²	66.29 ⁸¹	22.9 ¹⁹	19.55 ³⁷	45.5 ¹⁹	17.91 ²⁵
26.6	35.71 ²⁷	5.6 ¹⁷	67.10 ⁶⁸	24.8 ²⁴	19.92 ³⁴	47.4 ²¹	18.16 ²³
Oct. 6.6	35.98 ²²	7.3 ²²	67.78 ⁵³	27.2 ³¹	20.26 ²⁶	49.5 ²¹	18.39 ²¹
16.6	36.20 ¹⁸	9.5 ²⁵	68.31 ³⁶	30.0 ³¹	20.56 ²⁶	51.6 ²¹	18.60 ¹⁸
26.5	36.38 ¹³	12.0 ²⁷	68.67 ¹⁷	33.1 ³³	20.82 ²¹	53.7 ²²	18.78 ¹⁴
Nov. 5.5	36.51 ⁸	14.7 ²⁹	68.84 ²	36.4 ³³	21.03 ¹⁷	55.9 ²¹	18.92 ¹²
15.5	36.59 ³	17.6 ²⁹	68.82 ²¹	39.7 ³³	21.20 ¹²	58.0 ²¹	19.04 ⁹
25.5	36.62 ¹	20.5 ²⁸	68.61 ⁴⁰	43.0 ³¹	21.32 ⁷	60.0 ¹⁹	19.13 ⁶
Dec. 5.4	36.61 ⁶	23.3 ²⁶	68.21 ⁵⁷	46.1 ²⁸	21.39 ¹	61.9 ¹⁷	19.19 ²
15.4	36.55 ¹¹	25.9 ²⁴	67.64 ⁷²	48.9 ²⁴	21.40 ⁴	63.6 ¹⁵	19.21 ¹
25.4	36.44 ¹⁴	28.3 ²⁰	66.92 ⁸⁶	51.3 ²⁰	21.36 ¹⁰	65.1 ¹³	19.20 ⁵
35.4	36.30	30.3	66.06	53.3	21.26	66.4	19.15
Sec δ, Tan δ	1.376	-0.945	4.692	-4.585	1.542	+1.174	1.012
Mean Place	31° 9' 60"	39° 34'	63° 13' 8"	57° 7' 79"	14° 7' 96"	34° 51'	14° 2' 12"
D _ψ α, D _ω α	-0.02	+0.04	-0.09	+0.20	+0.02	-0.05	0.00
D _ψ δ, D _ω δ	+0.3	+0.8	+0.3	+0.8	+0.3	+0.8	+0.3

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	2 H. Camelop. Mag. 4.4		ξ Tauri. Mag. 3.8		f Tauri. Mag. 4.3		ε Eridani. Mag. 3.8	
	Right Ascension.	Declination N.	Right Ascension.	Declination N.	Right Ascension.	Declination N.	Right Ascension.	Declination S.
	h m	° '	h m	° '	h m	° '	h m	° '
	3 22	+59 38	3 22	+9 26	3 26	+12 38	3 28	-9 44
	s	"	s	"	s	"	s	"
n. 0.4	12.70	63.1	35.09	22.1	12.16	56.1	57.01	38.6
10.3	12.52 ¹⁸	64.6 ¹⁵	35.02 ⁷	21.5 ⁶	12.10 ⁶	55.7 ⁴	56.94 ⁷	39.9 ¹³
20.3	12.28 ²⁴	65.6 ¹⁰	34.93 ⁹	21.0 ⁵	12.01 ⁹	55.3 ⁴	56.84 ¹⁰	40.9 ¹⁰
30.3	11.99 ²⁹	66.2 ⁶	34.81 ¹²	20.5 ⁵	11.89 ¹²	54.8 ⁵	56.71 ¹³	41.7 ⁸
b. 9.3	11.67 ³²	66.3 ¹	34.68 ¹³	20.0 ⁵	11.75 ¹⁴	54.4 ⁵	56.56 ¹⁵	42.2 ⁵
	34	3	15	4	15	4	16	3
19.2	11.33	66.0	34.53	19.6	11.60	53.9	56.40	42.5
r. 1.2	10.99 ³⁴	65.3 ⁷	34.38 ¹⁵	19.2 ⁴	11.45 ¹⁵	53.5 ⁴	56.24 ¹⁶	42.6 ¹
11.2	10.68 ³¹	64.1 ¹²	34.24 ¹⁴	19.0 ²	11.31 ¹⁴	53.2 ³	56.09 ¹⁵	42.4 ²
21.1	10.40 ²⁸	62.5 ¹⁶	34.11 ¹³	18.8 ²	11.18 ¹³	52.9 ³	55.95 ¹⁴	41.9 ⁵
31.1	10.18 ²²	60.7 ¹⁸	34.01 ¹⁰	18.7 ¹	11.07 ¹¹	52.7 ²	55.83 ¹²	41.2 ⁷
	16	21	7	1	7	1	8	10
r. 10.1	10.02	58.6	33.94	18.8	11.00	52.6	55.75	40.2
20.1	9.94 ⁸	56.5 ²¹	33.91 ³	19.0 ²	10.97 ³	52.7 ¹	55.70 ⁵	39.0 ¹²
30.0	9.95 ¹	54.3 ²²	33.93 ²	19.4 ⁴	10.99 ²	52.9 ²	55.70 ⁰	37.5 ¹⁵
y 10.0	10.04 ⁹	52.1 ²²	33.99 ⁶	20.0 ⁶	11.05 ⁶	53.3 ⁴	55.74 ⁴	35.8 ¹⁷
20.0	10.22 ¹⁸	50.1 ²⁰	34.10 ¹¹	20.8 ⁸	11.16 ¹¹	53.9 ⁶	55.82 ⁸	34.0 ¹⁸
	26	18	15	10	15	7	13	20
30.0	10.48	48.3	34.25	21.8	11.31	54.6	55.95	32.0
ie 8.9	10.81 ³³	46.7 ¹⁶	34.45 ²⁰	22.9 ¹¹	11.50 ¹⁹	55.6 ¹⁰	56.12 ¹⁷	29.9 ²¹
18.9	11.21 ⁴⁰	45.5 ¹²	34.68 ²³	24.2 ¹³	11.73 ²³	56.7 ¹¹	56.33 ²¹	27.7 ²²
28.9	11.67 ⁴⁶	44.6 ⁹	34.94 ²⁶	25.6 ¹⁴	12.00 ²⁷	57.9 ¹²	56.57 ²⁴	25.6 ²¹
y 8.8	12.17 ⁵³	44.1 ⁵	35.23 ²⁹	27.1 ¹⁵	12.29 ³⁰	59.3 ¹⁴	56.84 ²⁷	23.5 ²¹
		1	30	15		14	29	20
18.8	12.70	44.0	35.53	28.6	12.59	60.7	57.13	21.5
28.8	13.26 ⁵⁶	44.2 ²	35.84 ³¹	30.1 ¹⁵	12.90 ³¹	62.1 ¹⁴	57.43 ³⁰	19.7 ¹⁸
g. 7.8	13.82 ⁵⁶	44.8 ⁶	36.16 ³²	31.5 ¹⁴	13.22 ³²	63.5 ¹⁴	57.73 ³⁰	18.1 ¹⁶
17.7	14.38 ⁵⁶	45.8 ¹⁰	36.47 ³¹	32.8 ¹³	13.54 ³²	64.8 ¹³	58.03 ³⁰	16.8 ¹³
27.7	14.93 ⁵⁵	47.1 ¹³	36.77 ³⁰	34.0 ¹²	13.85 ³¹	66.0 ¹²	58.33 ³⁰	15.8 ¹⁰
	53	16	29	10	29	10	28	7
nt. 6.7	15.46	48.7	37.06	35.0	14.14	67.0	58.61	15.1
16.7	15.96 ⁵⁰	50.6 ¹⁹	37.34 ²⁸	35.9 ⁹	14.42 ²⁸	67.9 ⁹	58.88 ²⁷	14.8 ³
26.6	16.43 ⁴⁷	52.7 ²¹	37.59 ²⁵	36.5 ⁶	14.68 ²⁶	68.7 ⁸	59.13 ²⁵	14.9 ¹
.. 6.6	16.86 ⁴³	55.0 ²³	37.82 ²³	36.9 ⁴	14.92 ²⁴	69.2 ⁵	59.36 ²³	15.3 ⁴
16.6	17.24 ³⁸	57.4 ²⁴	38.03 ²¹	37.1 ²	15.14 ²²	69.5 ³	59.56 ²⁰	16.1 ⁸
	32	25	18	0	18	2	17	11
26.5	17.56	59.9	38.21	37.1	15.32	69.7	59.73	17.2
v. 5.5	17.83 ²⁷	62.5 ²⁶	38.37 ¹⁶	36.9 ²	15.48 ¹⁶	69.8 ¹	59.88 ¹⁵	18.4 ¹²
15.5	18.04 ²¹	65.1 ²⁶	38.49 ¹²	36.7 ²	15.61 ¹³	69.7 ¹	59.99 ¹¹	19.9 ¹⁵
25.5	18.18 ¹⁴	67.7 ²⁴	38.58 ⁹	36.3 ⁴	15.71 ⁶	69.5 ²	60.07 ⁸	21.4 ¹⁵
.. 5.4	18.26 ⁸	70.1 ²⁴	38.64 ⁶	35.8 ⁵	15.77 ⁶	69.2 ³	60.12 ⁵	23.0 ¹⁶
	1	22	2	6		4	1	15
15.4	18.25	72.3	38.66	35.2	15.80	68.8	60.13	24.5
25.4	18.18 ⁷	74.3 ²⁰	38.65 ¹	34.7 ⁵	15.80	68.4 ⁴	60.11 ²	26.0 ¹⁵
35.4	18.04 ¹⁴	76.0 ¹⁷	38.61 ⁴	34.1 ⁶	15.76 ⁴	68.0 ⁴	60.05 ⁶	27.3 ¹³
Tan δ	1.979	+1.708	1.014	+0.166	1.025	+0.224	1.015	-0.172
Place	10°.563	42''.66	33°.631	12''.97	10°.686	46''.18	55°.491	42''.81
D _α	+0.03	-0.07	0.00	-0.01	0.00	-0.01	0.00	+0.01
D _δ	+0.3	+0.8	+0.3	+0.8	+0.2	+0.8	+0.2	+0.8

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	τ^5 Eridani. Mag. 4.3		δ Persei. Mag. 3.1		δ Eridani. Mag. 3.7		ν M
	Right Ascension.	Declination S.	Right Ascension.	Declination N.	Right Ascension.	Declination S.	Right Ascension.
	h m s	° ' "	h m s	° ' "	h m s	° ' "	h m s
	3 30	— 21 54	3 36	+ 47 31	3 39	— 10 2	3 39
Jan. 0.4	3.51	61.5	53.87	18.0	12.11	57.9	26.64
10.3	3.42 9	63.1 16	53.78 9	19.1 11	12.04 7	59.1 12	26.56
20.3	3.30 12	64.3 12	53.63 15	19.9 8	11.95 9	60.1 10	26.44
30.3	3.16 14	65.2 9	53.44 19	20.3 4	11.83 12	60.9 8	26.28
Feb. 9.3	2.99 17	65.8 6	53.22 22	20.4 1	11.68 15	61.5 6	26.09
19.2	2.82 17	66.0 2	52.99 23	20.1 3	11.52 16	61.9 4	25.88
Mar. 1.2	2.64 18	65.8 2	52.75 24	19.5 6	11.36 16	62.0 1	25.66
11.2	2.46 18	65.3 5	52.52 23	18.6 9	11.20 16	61.8 2	25.45
21.2	2.31 15	64.4 9	52.31 21	17.4 12	11.06 14	61.3 5	25.26
31.1	2.18 13	63.2 12	52.14 17	16.0 14	10.93 13	60.6 7	25.11
Apr. 10.1	2.08 10	61.7 15	52.02 12	14.4 16	10.84 9	59.6 10	25.00
20.1	2.01 7	60.0 17	51.96 6	12.7 17	10.79 5	58.4 12	24.94
30.0	2.00 1	57.9 21	51.96 0	11.1 16	10.78 1	56.9 15	24.94
May 10.0	2.03 3	55.6 23	52.02 6	9.5 16	10.81 3	55.3 16	25.00
20.0	2.10 7	53.2 24	52.15 13	8.1 14	10.89 8	53.4 19	25.12
30.0	2.23 13	50.6 26	52.35 20	6.8 13	11.01 12	51.4 20	25.30
June 8.9	2.39 16	48.0 26	52.60 25	5.7 11	11.17 16	49.3 21	25.53
18.9	2.60 21	45.4 26	52.90 30	5.0 7	11.17 20	47.1 22	25.82
28.9	2.84 24	42.8 26	53.25 35	4.5 5	11.37 24	44.9 21	26.14
July 8.9	3.11 27	40.3 25	53.64 39	4.3 2	11.61 26	42.8 22	26.50
18.8	3.40 29	38.1 22	54.05 41	4.3 1	11.87 28	40.8 20	26.88
28.8	3.71 31	36.1 20	54.48 43	4.4 4	12.15 30	39.0 18	27.28
Aug. 7.8	3.71 31	34.5 16	54.92 44	4.8 7	12.45 30	37.3 17	27.68
17.7	4.02 31	33.5 13	54.92 44	5.5 9	12.75 31	37.3 13	27.68
27.7	4.33 31	33.2 8	55.36 43	6.4 11	13.06 31	36.0 10	28.09
Sept. 6.7	4.64 30	32.4 4	55.79 42	7.5 14	13.36 29	35.0 7	28.49
16.7	4.94 28	32.0 0	56.21 40	8.9 15	13.65 27	34.3 3	28.88
26.6	5.22 25	32.0 5	56.61 38	10.4 17	13.92 26	34.0 1	29.25
Oct. 6.6	5.47 23	32.5 10	56.99 34	12.1 18	14.18 23	34.1 4	29.60
16.6	5.70 21	33.5 13	57.33 32	13.9 19	14.41 21	34.5 8	29.92
26.6	5.91 18	34.8 16	57.65 28	15.8 19	14.62 19	35.3 10	30.21
Nov. 5.5	6.09 14	36.4 19	57.93 24	17.7 19	14.81 15	36.3 13	30.47
15.5	6.23 10	38.3 21	58.17 19	19.6 20	14.96 13	37.6 15	30.70
25.5	6.33 7	40.4 22	58.36 14	21.6 18	15.09 9	39.1 16	30.88
Dec. 5.4	6.40 0	42.6 20	58.50 10	23.4 17	15.18 6	40.7 16	31.02
15.4	6.44 4	44.8 20	58.60 4	25.2 17	15.24 2	42.3 16	31.12
25.4	6.44 4	46.8 20	58.64 1	26.9 14	15.26 1	43.9 14	31.17
35.4	6.40 7	48.8 17	58.63 7	28.3 13	15.25 1	45.3 14	31.16
	6.33 7	50.5 17	58.56 7	29.6 13	15.20 5	46.7 14	31.11
Sec δ , Tan δ	1.078	— 0.402	1.481	+ 1.092	1.016	— 0.177	1.3
Mean Place	1°.905	62'' .76	51°.984	0' .31	10°.548	62'' .13	24°.8
$D'\psi\alpha$, $D_\omega\alpha$	— 0.01	+ 0.02	+ 0.02	— 0.04	0.00	+ 0.01	+ 0.01
$D\psi\delta$, $D_\omega\delta$	+ 0.2	+ 0.8	+ 0.2	+ 0.8	+ 0.2	+ 0.8	+ 0.2

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	5 H. Camelop. Mag. 4.7		7 Tauri. (Alcyone.) Mag. 3.0		7 ^e Eridani. Mag. 4.3		8 ^e Eridani. Mag. 4.2	
	Right Ascension.	Declination N.	Right Ascension.	Declination N.	Right Ascension.	Declination S.	Right Ascension.	Declination S.
	h m 3 41 s	° ' +71 4	h m 3 42 s	° ' +23 50	h m 3 43 s	° ' -23 29	h m 3 46 s	° ' -36 26
Jan. 0.4	25.26	38.8	27.32	47.7	13.11	57.0	18.29	86.1
10.4	24.96 ³⁰	40.9 ²¹	27.27 ⁵	47.7 ⁰	13.02 ⁹	58.7 ¹⁷	18.17 ¹²	88.0 ¹⁹
20.3	24.57 ³⁹	42.5 ¹⁶	27.18 ⁹	47.7 ⁰	12.90 ¹²	60.0 ¹³	18.01 ¹⁶	89.6 ¹⁶
30.3	24.09 ⁴⁸	43.6 ¹¹	27.06 ¹²	47.5 ²	12.75 ¹⁵	61.0 ¹⁰	17.82 ¹⁹	90.7 ¹¹
Feb. 9.3	23.56 ⁵³	44.2 ⁶	26.92 ¹⁴	47.3 ²	12.58 ¹⁷	61.7 ⁷	17.61 ²¹	91.4 ⁷
	56	0	16	4	18	3	22	2
19.2	23.00	44.2	26.76	46.9	12.40	62.0	17.39	91.6
Mar. 1.2	22.43 ⁵⁷	43.7 ⁵	26.59 ¹⁷	46.4 ⁵	12.21 ¹⁹	62.0 ⁰	17.16 ²³	91.3 ³
11.2	21.88 ⁵⁵	42.6 ¹¹	26.43 ¹⁶	45.9 ⁵	12.03 ¹⁸	61.5 ⁵	16.93 ²³	90.6 ⁷
21.2	21.39 ⁴⁹	41.1 ¹⁵	26.28 ¹⁵	45.3 ⁶	11.86 ¹⁷	60.7 ⁸	16.72 ²¹	89.5 ¹¹
31.1	20.98 ⁴¹	39.2 ¹⁹	26.16 ¹²	44.7 ⁶	11.72 ¹⁴	59.6 ¹¹	16.54 ¹⁸	87.9 ¹⁶
	32	22	9	6	12	15	15	19
Apr. 10.1	20.66	37.0	26.07	44.1	11.60	58.1	16.39	86.0
20.1	20.45 ²¹	34.6 ²⁴	26.03 ⁴	43.6 ⁵	11.53 ⁷	56.3 ¹⁸	16.28 ¹¹	83.7 ²³
30.1	20.37 ⁸	32.0 ²⁶	26.03 ⁰	43.2 ⁴	11.50 ³	54.2 ²¹	16.22 ⁶	81.1 ²⁶
May 10.0	20.42 ⁵	29.4 ²⁶	26.08 ⁵	42.9 ³	11.51 ¹	51.9 ²³	16.21 ¹	78.3 ²⁸
20.0	20.60 ¹⁸	26.9 ²⁵	26.18 ¹⁰	42.7 ²	11.57 ⁶	49.5 ²⁴	16.25 ⁴	75.4 ²⁹
	31	23	15	1	11	26	9	31
30.0	20.91	24.6	26.33	42.8	11.68	46.9	16.34	72.3
June 8.9	21.34 ⁴³	22.4 ²²	26.52 ¹⁹	43.1 ³	11.83 ¹⁵	44.2 ²⁷	16.49 ¹⁵	69.2 ³¹
18.9	21.87 ⁵³	20.5 ¹⁹	26.76 ²⁴	43.5 ⁴	12.03 ²⁰	41.5 ²⁷	16.68 ¹⁹	66.1 ³¹
28.9	22.49 ⁶²	19.0 ¹⁵	27.03 ²⁷	44.1 ⁶	12.26 ²³	38.9 ²⁶	16.91 ²³	63.1 ³⁰
July 8.9	23.19 ⁷⁰	17.8 ¹²	27.32 ²⁹	44.9 ⁸	12.52 ²⁶	36.5 ²⁴	17.18 ²⁷	60.3 ²⁸
	76	7	32	9	28	23	30	25
18.8	23.95 ⁸⁰	17.1 ³	27.64 ³³	45.8 ¹⁰	12.80	34.2	17.48	57.8
28.8	24.75 ⁸⁰	16.8 ³	27.97 ³³	46.8 ¹⁰	13.10 ³⁰	32.2 ²⁰	17.80 ³²	55.7 ²¹
Aug. 7.8	25.58 ⁸³	16.9 ¹	28.31 ³⁴	47.9 ¹¹	13.41 ³¹	30.5 ¹⁷	18.13 ³³	53.9 ¹⁸
17.7	26.42 ⁸⁴	17.4 ⁵	28.65 ³⁴	49.0 ¹¹	13.72 ³¹	29.2 ¹³	18.47 ³⁴	52.7 ¹²
27.7	27.25 ⁸²	18.3 ⁹	28.98 ³³	50.2 ¹²	14.03 ³¹	28.3 ⁹	18.81 ³⁴	51.9 ⁸
	82	13	32	11	30	4	33	2
Sept 6.7	28.07	19.6	29.30	51.3	14.33	27.9	19.14	51.7
16.7	28.85 ⁷⁸	21.3 ¹⁷	29.61 ³¹	52.4 ¹¹	14.62 ²⁹	27.9 ⁰	19.45 ³¹	52.0 ³
26.6	29.59 ⁷⁴	23.3 ²⁰	29.90 ²⁹	53.4 ¹⁰	14.89 ²⁷	28.5 ⁶	19.74 ²⁹	52.9 ⁹
Oct. 6.6	30.27 ⁶⁸	25.6 ²³	30.17 ²⁷	54.3 ⁹	15.13 ²⁴	29.4 ⁹	20.00 ²⁶	54.2 ¹³
16.6	30.88 ⁶¹	28.2 ²⁶	30.41 ²⁴	55.1 ⁸	15.35 ²²	30.8 ¹⁴	20.23 ²³	56.1 ¹⁹
	53	27	21	7	18	17	20	22
26.6	31.41	30.9	30.62	55.8	15.53	32.5	20.43	58.3
Nov. 5.5	31.85 ⁴⁴	33.8 ²⁹	30.81 ¹⁹	56.4 ⁶	15.69 ¹⁶	34.5 ²⁰	20.59 ¹⁶	60.8 ²⁵
15.5	32.20 ³⁵	36.8 ³⁰	30.97 ¹⁶	57.0 ⁶	15.81 ¹²	36.7 ²²	20.71 ¹²	63.5 ²⁷
25.5	32.43 ²³	39.8 ³⁰	31.09 ¹²	57.4 ⁴	15.89 ⁸	39.0 ²³	20.78 ⁷	66.4 ²⁹
Dec. 5.4	32.55 ¹²	42.8 ³⁰	31.18 ⁹	57.8 ⁴	15.94 ⁵	41.3 ²³	20.81 ³	69.2 ²⁸
	1	28	5	2	1	23	1	26
15.4	32.56	45.6	31.23	58.0	15.95	43.6	20.80	71.8
25.4	32.44 ¹²	48.1 ²⁵	31.24 ¹	58.2 ²	15.92 ³	45.7 ²¹	20.74 ⁶	74.3 ²⁵
35.4	32.21 ²³	50.3 ²²	31.21 ³	58.3 ¹	15.85 ⁷	47.5 ¹⁸	20.64 ¹⁰	76.5 ²²
Sec δ, Tan δ	3.083	+2.017	1.093	+0.442	1.091	-0.435	1.243	-0.739
Mean Place	21 ^h .890	17 ^m .87	25 ^h .719	35 ^m .18	11 ^h .433	58 ^m .26	16 ^h .434	84 ^m .91
D ₁ α, D ₂ α	+0.06	-0.11	+0.01	-0.02	-0.01	+0.02	-0.02	+0.03
D ₁ δ, D ₂ δ	+0.2	+0.8	+0.2	+0.8	+0.2	+0.8	+0.2	+0.8

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	γ Hydr. Mag. 3.2		ζ Persel. Mag. 2.9		θ H. Camelop. Mag. 5.2		ϵ Persel. Mag. 3.0	
	Right Ascension.	Declination S.	Right Ascension.	Declination N.	Right Ascension.	Declination N.	Right Ascension.	Declination N.
	h m 3 48	° ' " -74 29	h m 3 48	° ' " +31 37	h m 3 49	° ' " +60 51	h m 3 52	° ' " +39 45
Jan. 0.4	37.03 ^s	64.3 ^s	48.81 ^s	69.6 ^s	55.29 ^s	58.8 ^s	10.60 ^s	70.7 ^s
10.4	36.37 ⁶⁶	66.3 ²⁰	48.76 ⁵	70.1 ⁵	55.14 ¹⁵	60.6 ¹⁸	10.53 ⁷	71.5 ⁸
20.3	35.62 ⁷⁵	67.8 ¹⁵	48.67 ⁹	70.3 ²	54.92 ²²	61.9 ¹³	10.42 ¹¹	72.1 ⁶
30.3	34.80 ⁸²	68.8 ¹⁰	48.54 ¹³	70.4 ¹	54.64 ²⁸	62.8 ⁹	10.28 ¹⁴	72.4 ³
Feb. 9.3	33.94 ⁸⁶	69.1 ³	48.38 ¹⁶	70.3 ¹	54.32 ³²	63.3 ⁵	10.10 ¹⁸	72.5 ¹
19.2	33.06 ⁸⁸	68.9 ²	48.21 ¹⁷	70.0 ³	53.97 ³⁵	63.4 ¹	9.90 ²⁰	72.3 ²
Mar. 1.2	32.18 ⁸⁸	68.2 ⁷	48.02 ¹⁹	69.5 ⁵	53.61 ³⁶	62.9 ⁵	9.69 ²¹	71.8 ⁵
11.2	31.34 ⁸⁴	66.8 ¹⁴	47.84 ¹⁸	68.9 ⁶	53.26 ³⁵	62.0 ⁹	9.49 ²⁰	71.1 ⁷
21.2	30.54 ⁸⁰	65.0 ¹⁸	47.68 ¹⁶	68.1 ⁸	52.94 ³²	60.7 ¹³	9.30 ¹⁹	70.2 ⁹
31.1	29.81 ⁷³	62.7 ²³	47.55 ¹³	67.3 ⁸	52.67 ²⁷	59.1 ¹⁶	9.15 ¹⁵	69.1 ¹¹
Apr. 10.1	29.17 ⁶⁴	60.1 ²⁶	47.45 ¹⁰	66.4 ⁹	52.47 ²⁰	57.2 ¹⁹	9.03 ¹²	67.9 ¹²
20.1	28.64 ⁵³	57.1 ³⁰	47.39 ⁶	65.5 ⁹	52.34 ¹³	55.1 ²¹	8.96 ⁷	66.6 ¹³
30.1	28.24 ⁴⁰	53.8 ³³	47.38 ¹	64.7 ⁸	52.29 ⁵	52.9 ²²	8.95 ¹	65.4 ¹²
May 10.0	27.96 ²⁸	50.3 ³⁵	47.43 ⁵	63.9 ⁸	52.33 ⁴	50.7 ²²	8.99 ⁴	64.2 ¹²
20.0	27.82 ¹⁴	46.7 ³⁶	47.53 ¹⁰	63.3 ⁶	52.46 ¹³	48.6 ²¹	9.09 ¹⁰	63.1 ¹¹
30.0	27.81 ¹	43.1 ³⁶	47.68 ¹⁵	62.9 ⁴	52.68 ²²	46.6 ²⁰	9.25 ¹⁶	62.2 ⁹
June 8.9	27.95 ¹⁴	39.6 ³⁵	47.88 ²⁰	62.7 ²	52.98 ³⁰	44.8 ¹⁸	9.47 ²²	61.5 ⁷
18.9	28.23 ²⁸	36.2 ³⁴	48.13 ²⁵	62.6 ¹	53.35 ³⁷	43.3 ¹⁵	9.73 ²⁶	61.0 ⁵
28.9	28.64 ⁴¹	33.0 ³²	48.41 ²⁸	62.8 ²	53.79 ⁴⁴	42.1 ¹²	10.03 ³⁰	60.8 ²
July 8.9	29.16 ⁵²	30.1 ²⁹	48.72 ³¹	63.2 ⁴	54.28 ⁴⁹	41.2 ⁹	10.37 ³⁴	60.8 ⁰
18.8	29.78 ⁶²	27.6 ²⁵	49.05 ³³	63.8 ⁶	54.81 ⁵³	40.7 ⁵	10.73 ³⁶	61.0 ²
28.8	30.48 ⁷⁰	25.6 ²⁰	49.40 ³⁵	64.5 ⁷	55.37 ⁵⁶	40.5 ²	11.11 ³⁸	61.5 ⁵
Aug. 7.8	31.25 ⁷⁷	24.1 ¹⁵	49.76 ³⁶	65.4 ⁹	55.94 ⁵⁷	40.7 ²	11.51 ⁴⁰	62.2 ⁷
17.8	32.06 ⁸¹	23.2 ⁹	50.12 ³⁶	66.4 ¹⁰	56.53 ⁵⁹	41.3 ⁶	11.90 ³⁹	63.0 ⁸
27.7	32.89 ⁸³	22.8 ⁴	50.48 ³⁶	67.5 ¹¹	57.11 ⁵⁸	42.2 ⁹	12.29 ³⁹	64.0 ¹⁰
Sept. 6.7	33.70 ⁸¹	23.1 ³	50.82 ³⁴	67.5 ¹¹	57.11 ⁵⁷	42.2 ¹²	12.29 ³⁸	64.0 ¹²
16.7	34.48 ⁷⁸	24.1 ¹⁰	51.15 ³³	68.6 ¹²	57.68 ⁵⁴	43.4 ¹⁵	12.67 ³⁶	65.2 ¹²
26.6	35.20 ⁷²	25.6 ¹⁵	51.47 ³²	69.8 ¹²	58.22 ⁵²	44.9 ¹⁸	13.03 ³⁵	66.4 ¹²
Oct. 6.6	35.83 ⁶³	27.7 ²¹	51.76 ²⁹	70.9 ¹¹	58.74 ⁵²	46.7 ¹⁸	13.38 ³⁵	67.8 ¹⁴
16.6	36.35 ⁵²	30.3 ²⁶	52.03 ²⁷	72.1 ¹²	59.22 ⁴⁸	48.7 ²⁰	13.70 ³²	69.2 ¹⁴
26.6	36.75 ⁴⁰	33.2 ²⁹	52.27 ²⁴	73.2 ¹¹	59.66 ⁴⁴	50.9 ²²	14.00 ³⁰	70.6 ¹⁴
Nov. 5.5	37.01 ²⁶	36.4 ³²	52.48 ²¹	74.3 ¹¹	60.05 ³⁹	53.2 ²³	14.27 ²⁷	72.1 ¹⁵
15.5	37.13 ¹²	39.8 ³⁴	52.65 ¹⁷	75.3 ¹⁰	60.39 ³⁴	55.7 ²⁵	14.50 ²³	73.5 ¹⁴
25.5	37.09 ⁴	43.3 ³⁵	52.79 ¹⁴	76.3 ¹⁰	60.66 ²⁷	58.2 ²⁵	14.70 ²⁰	74.9 ¹⁴
Dec. 5.5	36.89 ²⁰	46.6 ³³	52.89 ¹⁰	77.2 ⁹	60.86 ²⁰	60.7 ²⁵	14.85 ¹⁵	76.3 ¹³
15.4	36.56 ³³	49.7 ³¹	52.95 ⁶	78.1 ⁷	60.99 ⁵	63.2 ²³	14.96 ⁶	77.6 ¹²
25.4	36.09 ⁴⁷	52.5 ²⁸	52.96 ¹	79.4 ⁶	61.04 ³	65.5 ²²	15.02 ²	78.8 ¹¹
35.4	35.49 ⁶⁰	54.8 ²³	52.93 ³	79.9 ⁵	61.01 ¹¹	67.7 ¹⁹	15.04 ⁴	79.9 ¹⁰
Sec δ , Tan δ	3.741	-3.605	1.175	+0.616	2.054	+1.794	1.301	+0.832
Mean Place	32°.442	58''.93	47°.105	55''.55	52°.744	39''.62	8°.747	55''.06
D' ψ α , D ω α	-0.08	+0.13	+0.01	-0.02	+0.04	-0.06	+0.02	-0.03
D' ψ δ , D ω δ	+0.2	+0.8	+0.2	+0.8	+0.2	+0.8	+0.2	+0.8

[Eph 14]

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	ε Persei. Mag. 4.0		γ Eridani. Mag. 3.2		λ Tauri. Var. 3.3-4.2		δ Reticuli. Mag. 4.4	
	Right Ascension.	Declination N.	Right Ascension.	Declination S.	Right Ascension.	Declination N.	Right Ascension.	Declination S.
	h m	° ' "	h m	° ' "	h m	° ' "	h m	° ' "
	3 53	+35 32	3 54	-13 44	3 55	+12 15	3 57	-61 37
	s	"	s	"	s	"	s	"
Jan. 0.4	28.55	65.4	5.43	55.0	59.77	13.1	26.53	86.7
10.4	28.49 ⁶	66.0 ⁶	5.37 ⁶	56.4 ¹⁴	59.73 ⁴	12.7 ⁴	26.23 ³⁰	89.0 ²³
20.3	28.39 ¹⁰	66.5 ⁵	5.27 ¹⁰	57.6 ¹²	59.66 ⁷	12.3 ⁴	25.87 ³⁶	90.8 ¹⁸
30.3	28.26 ¹³	66.7 ²	5.15 ¹²	58.6 ¹⁰	59.55 ¹¹	11.8 ⁵	25.47 ⁴⁰	92.0 ¹²
Feb. 9.3	28.10 ¹⁶	66.7 ⁰	5.00 ¹⁵	59.3 ⁷	59.42 ¹³	11.4 ⁴	25.03 ⁴⁴	92.6 ⁶
	19	2	16	4	15	3	46	1
19.3	27.91	66.5	4.84	59.7	59.27	11.1	24.57	92.7
Mar. 1.2	27.72	66.0 ⁵	4.67	59.9 ²	59.11	10.7 ⁴	24.11	92.3 ⁴
11.2	27.53 ¹⁹	65.3 ⁷	4.50 ¹⁷	59.7 ²	58.95	10.4 ³	23.66	91.3 ¹⁰
21.2	27.35 ¹⁸	64.5 ⁸	4.34 ¹⁶	59.2 ⁵	58.81	10.2 ²	23.23	89.7 ¹⁶
31.1	27.20 ¹⁵	63.6 ⁹	4.21 ¹³	58.4 ⁸	58.69	10.0 ²	22.84	87.7 ²⁰
	11	11	11	10	10	1	33	24
Apr. 10.1	27.09	62.5	4.10	57.4	58.59	9.9	22.51	85.3
20.1	27.03 ⁶	61.5 ¹⁰	4.03 ⁷	56.1 ¹³	58.54	10.0 ¹	22.23	82.5 ²⁸
30.1	27.02	60.4	4.00 ³	54.5 ¹⁶	58.52	10.2 ²	22.03	79.4 ³¹
May 10.0	27.06 ⁴	59.5 ⁹	4.02 ²	52.7 ¹⁸	58.56	10.6 ⁴	21.90	76.1 ³³
20.0	27.16 ¹⁰	58.6 ⁹	4.08 ⁶	50.7 ²⁰	58.64	11.1 ⁵	21.85	72.6 ³⁵
	15	6	10	21	12	7	4	36
30.0	27.31	58.0	4.18	48.6	58.76	11.8	21.89	69.0
June 8.9	27.51 ²⁰	57.5 ⁵	4.33 ¹⁵	46.4 ²²	58.93	12.7 ⁹	22.01	65.5 ³⁵
18.9	27.76 ²⁵	57.2 ³	4.52 ¹⁹	44.1 ²³	59.14	13.7 ¹⁰	22.20	62.0 ³⁵
28.9	28.05 ²⁹	57.2 ⁰	4.74 ²²	41.8 ²³	59.38	14.8 ¹¹	22.47	58.7 ³³
July 8.9	28.37 ³²	57.4 ²	4.99 ²⁵	39.6 ²²	59.64	16.0 ¹²	22.81	55.7 ³⁰
	35	4	28	21	29	13	39	27
18.8	28.72	57.8	5.27	37.5	59.93	17.3	23.20	53.0
28.8	29.08 ³⁶	58.3 ⁵	5.56 ²⁰	35.6 ¹⁹	60.24	18.5 ¹²	23.64	50.7 ²³
Aug. 7.8	29.45 ³⁷	59.1 ⁸	5.86 ³⁰	34.0 ¹⁶	60.55	19.7 ¹²	24.11	49.0 ¹⁷
17.8	29.83 ³⁸	60.0 ⁹	6.16 ³⁰	32.6 ¹⁴	60.87	20.9 ¹²	24.61	47.9 ¹¹
27.7	30.20 ³⁷	61.0 ¹⁰	6.46 ³⁰	31.6 ¹⁰	61.18	22.0 ¹¹	25.11	47.3 ⁶
	36	11	30	6	30	9	49	0
Sept. 6.7	30.56	62.1	6.76	31.0	61.48	22.9	25.60	47.3
16.7	30.90 ³⁴	63.3 ¹²	7.04 ²⁸	30.8 ²	61.78	23.7 ⁸	26.08	48.0 ⁷
26.6	31.23 ³³	64.5 ¹²	7.31 ²⁷	31.0 ²	62.05	24.3 ⁶	26.52	49.3 ¹³
Oct. 6.6	31.54 ³¹	65.8 ¹³	7.55 ²⁴	31.6 ⁶	62.31	24.7 ⁴	26.92	51.2 ¹⁹
16.6	31.83 ²⁹	67.0 ¹²	7.77 ²²	32.5 ⁹	62.55	24.9 ²	27.27	53.5 ²³
	25	13	20	13	21	0	28	28
26.6	32.08	68.3	7.97	33.8	62.76	24.9	27.55	56.3
Nov. 5.5	32.30 ²²	69.5 ¹²	8.14 ¹⁷	35.3 ¹⁵	62.95	24.8 ¹	27.75	59.5 ³²
15.5	32.49 ¹⁹	70.7 ¹²	8.27 ¹³	37.0 ¹⁷	63.11	24.6 ²	27.88	62.8 ³³
25.5	32.64 ¹⁵	71.8 ¹¹	8.38 ¹¹	38.9 ¹⁹	63.23	24.2 ⁴	27.93	66.2 ³⁴
Dec. 5.5	32.75 ¹¹	72.9 ¹¹	8.45 ⁷	40.8 ¹⁹	63.33	23.8 ⁴	27.89	69.6 ³⁴
	6	9	3	18	6	4	11	32
15.4	32.81	73.8	8.48	42.6	63.39	23.4	27.78	72.8
25.4	32.83 ²	74.7 ⁹	8.48 ⁰	44.4 ¹⁸	63.41	23.0 ⁴	27.59	75.7 ²⁹
35.4	32.80 ³	75.4 ⁷	8.43 ⁵	46.0 ¹⁶	63.39	22.5 ⁵	27.32	78.2 ²⁵
the 4, Tan δ	1.229	+0.715	1.029	-0.245	1.023	+0.217	2.105	-1.852
Mean Place	26°.756	50''.68	3°.793	58''.63	58°.159	3''.56	23°.686	82''.80
Δα, Δα	+0.02	-0.03	-0.01	+0.01	0.00	-0.01	-0.04	+0.06
Δδ, Δδ	+0.2	+0.9	+0.2	+0.9	+0.2	+0.9	+0.2	+0.9

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	♋ Tauri. Mag. 3.9		♉ Tauri. Mag. 4.5		♈ Persei. Mag. 4.0		♊ Tauri. Mag. 5.6	
	Right Ascension.	Declination N.	Right Ascension.	Declination N.	Right Ascension.	Declination N.	Right Ascension.	Declination N.
	h m 3 58	° ' " + 5 45	h m 3 59	° ' " + 21 51	h m 4 2	° ' " + 47 29	h m 4 5	° ' " + 26 15
Jan. 0.4	39.61 ^s	23.4 [°]	41.73 ^s	13.7 [°]	31.25 ^s	28.4 [°]	40.83 ^s	48.4 [°]
10.4	39.57 ⁴	22.6 ⁸	41.69 ⁴	13.7 ⁰	31.18 ⁷	29.6 ¹²	40.79 ⁴	48.6 ²
20.3	39.50 ⁷	22.0 ⁶	41.62 ⁷	13.6 ¹	31.06 ¹²	30.5 ⁹	40.72 ⁷	48.7 ¹
30.3	39.39 ¹¹	21.4 ⁶	41.51 ¹¹	13.4 ²	30.89 ¹⁷	31.2 ⁷	40.61 ¹¹	48.8 ¹
Feb. 9.3	39.26 ¹³	20.9 ⁵	41.37 ¹⁴	13.2 ²	30.69 ²⁰	31.5 ³	40.46 ¹⁵	48.6 ²
19.3	39.11 ¹⁵	20.5 ⁴	41.21 ¹⁶	12.9 ³	30.46 ²³	31.5 ⁰	40.30 ¹⁶	48.4 ²
Mar. 1.2	38.96 ¹⁶	20.2 ³	41.05 ¹⁷	12.5 ⁴	30.21 ²⁵	31.1 ⁴	40.13 ¹⁷	48.0 ⁴
11.2	38.80 ¹⁶	20.0 ²	40.88 ¹⁷	12.0 ⁵	29.97 ²⁴	30.4 ⁷	39.95 ¹⁸	47.5 ⁵
21.2	38.66 ¹⁴	19.9 ¹	40.73 ¹⁵	11.6 ⁴	29.75 ²²	29.4 ¹⁰	39.79 ¹⁶	47.0 ⁵
31.1	38.53 ¹³	20.0 ¹	40.60 ¹³	11.1 ⁵	29.56 ¹⁹	28.2 ¹²	39.65 ¹⁴	46.4 ⁶
Apr. 10.1	38.43 ¹⁰	20.2 ²	40.50 ¹⁰	10.6 ⁵	29.41 ¹⁵	26.8 ¹⁴	39.54 ¹¹	45.7 ⁷
20.1	38.38 ⁵	20.6 ⁴	40.44 ⁶	10.2 ⁴	29.31 ¹⁰	25.2 ¹⁶	39.48 ⁶	45.1 ⁶
30.1	38.36 ²	21.1 ⁵	40.42 ²	9.9 ³	29.28 ³	23.6 ¹⁶	39.46 ²	44.6 ⁵
May 10.0	38.38 ²	21.9 ⁸	40.46 ⁴	9.7 ²	29.31 ³	22.1 ¹⁵	39.48 ²	44.1 ⁵
20.0	38.45 ⁷	22.8 ⁹	40.54 ⁸	9.7 ⁰	29.40 ⁹	20.6 ¹⁵	39.56 ⁸	43.8 ³
30.0	38.57 ¹²	23.8 ¹⁰	40.67 ¹³	9.8 ¹	29.56 ¹⁶	19.2 ¹⁴	39.69 ¹³	43.7 ¹
June 9.0	38.73 ¹⁶	25.1 ¹³	40.84 ¹⁷	10.1 ³	29.78 ²²	18.0 ¹²	39.87 ¹⁸	43.7 ⁰
18.9	38.93 ²⁰	26.4 ¹³	41.06 ²²	10.5 ⁴	30.06 ²⁸	17.0 ¹⁰	40.08 ²¹	43.8 ¹
28.9	39.16 ²³	27.8 ¹⁴	41.31 ²⁵	11.1 ⁶	30.39 ³³	16.3 ⁷	40.34 ²⁶	44.2 ⁴
July 8.9	39.42 ²⁸	29.3 ¹⁵	41.59 ²⁸	11.9 ⁸	30.75 ³⁶	15.9 ⁴	40.63 ²⁹	44.7 ⁵
18.8	39.70 ³⁰	30.8 ¹⁴	41.90 ³¹	12.8 ⁹	31.15 ⁴⁰	15.7 ²	40.94 ³¹	45.4 ⁷
28.8	40.00 ³⁰	32.2 ¹⁴	42.22 ³²	13.7 ⁹	31.57 ⁴²	15.8 ¹	41.27 ³³	46.2 ⁸
Aug. 7.8	40.30 ³⁰	33.6 ¹⁴	42.55 ³³	14.7 ¹⁰	32.00 ⁴³	16.2 ⁴	41.60 ³³	47.0 ⁸
17.8	40.61 ³¹	34.8 ¹²	42.88 ³³	15.8 ¹¹	32.44 ⁴⁴	16.8 ⁶	41.94 ³⁴	47.9 ⁹
27.7	40.92 ³¹	35.8 ¹⁰	43.21 ³³	16.8 ¹⁰	32.88 ⁴⁴	17.6 ⁸	42.29 ³⁵	48.9 ¹⁰
Sept. 6.7	41.22 ³⁰	36.7 ⁹	43.53 ³²	17.8 ¹⁰	33.31 ⁴³	18.7 ¹¹	42.62 ³³	49.9 ¹⁰
16.7	41.50 ²⁸	37.3 ⁶	43.84 ³¹	18.7 ⁹	33.72 ⁴¹	19.9 ¹²	42.94 ³²	50.8 ⁹
26.7	41.77 ²⁷	37.7 ⁴	44.14 ³⁰	19.5 ⁸	34.12 ⁴⁰	21.3 ¹⁴	43.25 ³¹	51.7 ⁹
Oct. 6.6	42.03 ²⁶	37.8 ¹	44.41 ²⁷	20.2 ⁷	34.49 ³⁷	22.8 ¹⁵	43.54 ²⁹	52.5 ⁸
16.6	42.26 ²³	37.7 ¹	44.67 ²⁶	20.8 ⁶	34.84 ³⁵	24.5 ¹⁷	43.81 ²⁷	53.3 ⁸
26.6	42.47 ²¹	37.4 ³	44.90 ²³	21.4 ⁶	35.15 ³¹	26.2 ¹⁷	44.05 ²⁴	54.0 ⁷
Nov. 5.5	42.65 ¹⁸	37.4 ⁵	45.10 ²⁰	21.8 ⁴	35.42 ²⁷	27.9 ¹⁷	44.27 ²²	54.6 ⁶
15.5	42.80 ¹⁵	36.3 ⁶	45.28 ¹⁸	22.1 ³	35.65 ²³	29.7 ¹⁸	44.46 ¹⁹	55.2 ⁶
25.5	42.93 ¹³	35.6 ⁷	45.42 ¹⁴	22.4 ³	35.84 ¹⁹	31.5 ¹⁸	44.61 ¹⁵	55.7 ⁵
Dec. 5.5	43.02 ⁹	34.8 ⁸	45.52 ¹⁰	22.6 ²	35.97 ⁸	33.3 ¹⁷	44.72 ¹¹	56.2 ⁴
15.4	43.08 ²	34.0 ⁸	45.59 ²	22.7 ¹	36.05 ²	35.0 ¹⁵	44.80 ³	56.6 ³
25.4	43.10 ²	33.2 ⁸	45.61 ¹	22.8 ⁰	36.07 ⁴	36.5 ¹⁵	44.83 ³	56.9 ³
35.4	43.08 ²	32.4 ⁸	45.60 ¹	22.8 ⁰	36.03 ⁴	37.8 ¹³	44.82 ¹	57.2 ³
Sec δ, Tan δ	1.005	+0.101	1.077	+0.401	1.480	+1.091	1.115	+0.493
Mean Place	38°.001	15''.28	40°.052	1''.09	29°.150	11''.80	39°.079	35''.98
Dψα, Dωα	0.00	0.00	+0.01	-0.01	+0.03	-0.04	+0.01	-0.02
Dψδ, Dωδ	+0.2	+0.9	+0.2	+0.9	+0.2	+0.9	+0.2	+0.9

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	α Eridani. Mag. 4.1		μ Tauri. Mag. 4.3		α Horologii. Mag. 3.8		α Reticuli. Mag. 3.4	
	Right Ascension.	Declination S.	Right Ascension.	Declination N.	Right Ascension.	Declination S.	Right Ascension.	Declination S.
	h m 4 7 s	° ' " - 7 3 "	h m 4 10 s	° ' " + 8 40 "	h m 4 11 s	° ' " - 42 29 "	h m 4 13 s	° ' " - 62 40 "
Jan. 0.4	44.59	25.0	56.70	57.7	13.15	74.5	22.52	74.1
10.4	44.55 4	26.2 12	56.67 3	57.1 6	13.02 13	76.8 23	22.22 30	76.5 24
20.3	44.47 8	27.3 11	56.60 7	56.5 6	12.85 17	78.7 19	21.86 36	78.5 20
30.3	44.36 11	28.2 9	56.50 10	56.0 5	12.64 21	80.1 14	21.45 41	79.9 14
Feb. 9.3	44.22 14	28.9 7	56.37 13	55.6 4	12.40 24	81.1 10	21.00 45	80.8 9
	16	5	14	4	25	4	48	3
19.3	44.06	29.4 2	56.23	55.2	12.15	81.5 0	20.52	81.1
Mar. 1.2	43.90	29.6 0	56.07	54.9 3	11.88	81.5 5	20.03 49	80.8 3
11.2	43.73	29.6 2	55.91	54.6 3	11.61	81.0 11	19.55 48	80.1 7
21.2	43.58	29.4 5	55.76	54.5 0	11.36	79.9 14	19.09 42	78.8 18
31.2	43.44 11	28.9 7	55.63 11	54.5 1	11.13 19	78.5 19	18.67 38	77.0 23
Apr. 10.1	43.33	28.2 10	55.52	54.6 2	10.94	76.6	18.29	74.7
20.1	43.26 7	27.2 12	55.45 2	54.8 2	10.78 16	74.3 23	17.97 32	72.1 26
30.1	43.22 4	26.0 12	55.43 1	55.2 4	10.67 11	71.8 25	17.73 24	69.1 30
May 10.0	43.23 1	24.6 14	55.44 6	55.7 5	10.62 5	68.9 29	17.56 17	65.9 32
20.0	43.28 5	23.0 16	55.50 11	56.4 7	10.62 0	65.9 30	17.47 9	62.5 34
	10	18		9	5	32	0	36
30.0	43.38	21.2 19	55.61	57.3	10.67	62.7	17.47	58.9
June 9.0	43.52 14	19.3 19	55.77 16	58.3 10	10.78 11	59.4 33	17.56 9	55.4 35
18.9	43.70 18	17.4 19	55.96 19	59.4 11	10.94 16	56.2 32	17.72 16	51.9 35
28.9	43.92 22	15.4 20	56.18 22	60.6 12	11.16 22	53.1 31	17.97 25	48.5 34
July 8.9	44.16 24	13.5 19	56.44 26	61.9 13	11.41 25	50.1 30	18.29 32	45.4 31
	27		27	14	29	27	37	27
18.9	44.43	11.6 18	56.71	63.3	11.70	47.4	18.66	42.7
28.8	44.71	9.8 16	57.01	64.6 13	12.02 32	45.1 23	19.09 43	40.3 24
Aug. 7.8	45.01 30	8.2 16	57.31 30	65.8 12	12.36 34	43.2 19	19.57 48	38.4 19
17.8	45.31 30	6.9 13	57.62 31	66.9 11	12.71 35	41.8 14	20.07 50	37.1 13
27.7	45.61 30	5.9 10	57.93 31	68.0 11	13.07 30	40.9 9	20.58 51	36.3 8
	30	7	30	8	35	3	51	1
Sept. 6.7	45.91	5.2 8	58.23	68.8	13.42	40.6	21.09	36.2
16.7	46.19 28	4.8 4	58.53 30	69.4 6	13.76 34	40.8 2	21.59 50	36.7 5
26.7	46.46 27	4.8 0	58.81 28	69.8 4	14.09 33	41.7 9	22.06 47	37.9 12
Oct. 6.6	46.71 25	5.1 3	59.07 26	70.0 2	14.39 30	43.1 14	22.49 43	39.6 17
16.6	46.95 24	5.8 7	59.31 24	70.0 0	14.66 27	45.0 19	22.87 38	41.9 23
	21	10	22	2	23	23	31	27
26.6	47.16	6.8	59.53	69.8	14.89	47.3	23.18	44.6
Nov. 5.6	47.34 18	8.0 12	59.73 20	69.5 3	15.08 19	50.0 27	23.42 24	47.7 31
15.5	47.49 15	9.4 14	59.90 17	69.0 5	15.23 15	52.9 29	23.58 16	51.0 33
25.5	47.61 12	10.9 15	60.04 10	68.4 6	15.32 9	56.0 31	23.66 8	54.5 35
Dec. 5.5	47.70 9	12.4 15	60.14 7	67.7 7	15.37 5	59.1 30	23.66 0	57.9 34
	6	16		7	0	30	10	33
15.4	47.76	14.0	60.21	67.0	15.37	62.1	23.56	61.2
25.4	47.77 1	15.5 15	60.24 3	66.3 7	15.32 5	64.9 28	23.39 17	64.3 31
35.4	47.75 2	16.9 14	60.24 0	65.7 6	15.21 11	67.4 25	23.13 26	67.0 27
Sec δ , Tan δ	1.008	-0.124	1.012	+0.153	1.356	-0.916	2.179	-1.936
Mean Place	42° 934	30' 128	55° 033	49' 08	11° 097	73' 56	19° 541	71' 08
D ϕ α , D μ α	0.00	0.00	0.00	0.00	-0.02	+0.03	-0.05	+0.06
D ϕ δ , D μ δ	+0.2	+0.9	+0.2	+0.9	+0.2	+0.9	+0.2	+0.9

[Eph 13]

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	γ Tauri. Mag. 3.9		δ Tauri. Mag. 3.9		ν^5 Eridani. Mag. 4.1		ϵ Taur. Mag. 3.	
	Right Ascension.	Declination N.	Right Ascension.	Declination N.	Right Ascension.	Declination S.	Right Ascension.	
	h m 4 14	° ' " +15 25	h m 4 18	° ' " +17 20	h m 4 20	° ' " -34 12	h m 4 23	+
Jan. 0.4	58.96 ^s	33.6 ["]	3.57 ^s	48.8 ["]	52.55 ^s	48.8 ["]	40.85 ^s	
10.4	58.94 ²	33.3 ³	3.55 ²	48.6 ²	52.46 ⁹	51.0 ²²	40.84 ¹	
20.3	58.88 ⁶	33.0 ³	3.49 ⁶	48.4 ²	52.33 ¹³	52.9 ¹⁹	40.78 ⁶	
30.3	58.78 ¹⁰	32.7 ³	3.39 ¹⁰	48.1 ³	52.17 ¹⁶	54.4 ¹⁵	40.68 ¹⁰	
Feb. 9.3	58.65 ¹³	32.4 ³	3.26 ¹³	47.9 ²	51.97 ²⁰	55.4 ¹⁰	40.55 ¹³	
19.3	58.50 ¹⁵	32.1 ³	3.11 ¹⁵	47.6 ³	51.75 ²²	55.9 ⁵	40.40 ¹⁵	
Mar. 1.2	58.34 ¹⁶	31.7 ⁴	2.95 ¹⁶	47.3 ³	51.53 ²²	56.1 ²	40.24 ¹⁶	
11.2	58.17 ¹⁷	31.4 ³	2.79 ¹⁶	46.9 ⁴	51.30 ²³	55.8 ³	40.07 ¹⁷	
21.2	58.02 ¹⁵	31.1 ³	2.63 ¹⁶	46.6 ³	51.08 ²²	55.0 ⁸	39.91 ¹⁶	
31.2	57.89 ¹³	30.9 ²	2.49 ¹⁴	46.3 ³	50.88 ²⁰	53.8 ¹²	39.77 ¹⁴	
Apr. 10.1	57.78 ¹¹	30.7 ²	2.38 ¹¹	46.1 ²	50.71 ¹⁷	52.2 ¹⁶	39.65 ¹²	
20.1	57.71 ⁷	30.6 ¹	2.31 ⁷	45.9 ²	50.57 ¹⁴	50.3 ¹⁹	39.58 ⁷	
30.1	57.68 ³	30.7 ¹	2.28 ³	45.8 ¹	50.48 ⁹	48.0 ²³	39.54 ⁴	
May 10.0	57.69 ¹	30.8 ¹	2.29 ¹	45.9 ¹	50.44 ⁴	45.5 ²⁵	39.55 ¹	
20.0	57.76 ⁷	31.1 ³	2.35 ⁶	46.1 ²	50.44 ⁰	42.7 ²⁸	39.61 ⁶	
30.0	57.87 ¹¹	31.6 ⁵	2.46 ¹¹	46.4 ³	50.50 ⁶	39.8 ²⁹	39.71 ¹⁰	
June 9.0	58.02 ¹⁵	32.2 ⁶	2.61 ¹⁵	46.9 ⁵	50.60 ¹⁰	36.8 ³⁰	39.86 ¹⁵	
18.9	58.22 ²⁰	32.9 ⁷	2.81 ²⁰	47.5 ⁶	50.76 ¹⁶	33.8 ³⁰	40.05 ¹⁹	
28.9	58.45 ²³	33.8 ⁹	3.04 ²³	48.2 ⁷	50.96 ²⁰	30.8 ³⁰	40.28 ²³	
July 8.9	58.71 ²⁶	34.8 ¹⁰	3.30 ²⁶	49.1 ⁹	51.19 ²³	28.0 ²⁸	40.54 ²⁶	
18.9	58.99 ²⁸	35.8 ¹⁰	3.59 ²⁹	50.0 ⁹	51.46 ²⁷	25.4 ²⁶	40.82 ²⁸	
28.8	59.29 ³⁰	36.8 ¹⁰	3.89 ³⁰	51.0 ¹⁰	51.75 ²⁹	23.1 ²³	41.13 ³¹	
Aug. 7.8	59.60 ³¹	37.9 ¹¹	4.20 ³¹	52.0 ¹⁰	52.06 ³¹	21.2 ¹⁹	41.44 ³¹	
17.8	59.92 ³²	38.9 ¹⁰	4.52 ³²	53.0 ¹⁰	52.39 ³³	19.7 ¹⁵	41.76 ³²	
27.7	60.24 ³²	39.9 ¹⁰	4.84 ³²	53.9 ⁹	52.72 ³³	18.7 ¹⁰	42.09 ³³	
Sept. 6.7	60.55 ³¹	40.7 ⁷	5.16 ³¹	54.8 ⁷	53.05 ³¹	18.2 ⁰	42.41 ³¹	
16.7	60.86 ²⁹	41.4 ⁶	5.47 ²⁹	55.5 ⁶	53.36 ³¹	18.2 ⁶	42.72 ³¹	
26.7	61.15 ²⁷	42.0 ⁴	5.76 ²⁸	56.1 ⁵	53.67 ³¹	18.8 ⁶	43.02 ³⁰	
Oct. 6.6	61.42 ²⁶	42.4 ³	6.04 ²⁶	56.6 ³	53.95 ²⁸	20.0 ¹²	43.31 ²⁹	
16.6	61.68 ²³	42.7 ¹	6.30 ²⁴	56.9 ²	54.21 ²⁶	21.6 ¹⁶	43.58 ²⁷	
26.6	61.91 ²¹	42.8 ⁰	6.54 ²²	57.1 ⁰	54.44 ²³	21.6 ²¹	43.83 ²⁵	
Nov. 5.6	62.12 ¹⁸	42.8 ¹	6.76 ¹⁸	57.1 ⁰	54.64 ²⁰	23.7 ²⁴	43.83 ²²	
15.5	62.30 ¹⁵	42.7 ²	6.94 ¹⁶	57.1 ⁰	54.80 ¹⁶	26.1 ²⁶	44.05 ¹⁹	
25.5	62.45 ¹²	42.5 ²	7.10 ¹²	57.1 ⁰	54.91 ¹¹	28.7 ²⁸	44.24 ¹⁶	
Dec. 5.5	62.57 ⁸	42.3 ³	7.22 ⁸	56.9 ²	54.99 ⁸	31.5 ²⁹	44.40 ¹³	
15.4	62.65 ³	42.0 ³	7.30 ⁵	56.7 ²	55.01 ²	34.4 ²⁸	44.53 ⁹	
25.4	62.68 ⁰	41.7 ⁴	7.35 ⁰	56.5 ²	55.00 ¹	37.2 ²⁷	44.62 ⁵	
35.4	62.68 ⁰	41.3 ⁴	7.35 ⁰	56.3 ²	54.93 ⁷	39.9 ²⁴	44.67 ⁰	
Sec δ , Tan δ	1.037	+0.276	1.048	+0.312	1.209	-0.680	1.058	
Mean Place	57°.254	23''.64	1°.841	38''.52	50°.633	49''.46	39°.084	3.
$D'\psi\alpha$, $D_\omega\alpha$	+0.01	-0.01	+0.01	-0.01	-0.02	+0.02	+0.01	
$D\psi\delta$, $D_\omega\delta$	+0.2	+0.9	+0.2	+0.9	+0.2	+0.9	+0.2	

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	δ Mensæ. Mag. 5.6		m Persel. Mag. 6.1		α Tauri. (Aldebaran.) Mag. 1.1		ν Eridani. Mag. 4.1	
	Right Ascension.	Declination S.	Right Ascension.	Declination N.	Right Ascension.	Declination N.	Right Ascension.	Declination S.
	h m	° '	h m	° '	h m	° '	h m	° '
	4 23	-80 24	4 27	+42 53	4 31	+16 20	4 32	- 3 31
	s	"	s	"	s	"	s	"
Jan. 0.4	48.57	53.3	27.98	14.8	4.26	31.3	5.96	25.3
10.4	47.56 ¹⁰¹	55.7 ²⁴	27.95 ³	15.9 ¹¹	4.25 ¹	31.1 ²	5.94 ²	26.5 ¹²
20.4	46.38 ¹¹⁸	57.7 ²⁰	27.86 ⁹	16.8 ⁹	4.19 ⁶	30.8 ³	5.88 ⁶	27.6 ¹¹
30.3	45.06 ¹³²	59.1 ¹⁴	27.73 ¹³	17.5 ⁷	4.10 ⁹	30.6 ²	5.78 ¹⁰	28.5 ⁹
Feb. 9.3	43.64 ¹⁴²	59.9 ⁸	27.56 ¹⁷	17.9 ⁴	3.98 ¹²	30.3 ³	5.66 ¹²	29.2 ⁷
	43.64 ¹⁴⁸	59.9 ³	27.56 ²¹	17.9 ¹	3.98 ¹⁵	30.3 ³	5.66 ¹⁵	29.2 ⁵
19.3	42.16	60.2	27.35	18.0	3.83	30.0	5.51	29.7
Mar. 1.2	40.67 ¹⁴⁹	60.0 ²	27.13 ²²	17.8 ²	3.67 ¹⁶	29.7 ³	5.35 ¹⁶	30.0 ³
11.2	39.19 ¹⁴⁸	59.2 ⁸	26.91 ²²	17.4 ⁴	3.50 ¹⁷	29.4 ³	5.18 ¹⁷	30.1 ¹
21.2	37.76 ¹⁴³	57.8 ¹⁴	26.70 ²¹	16.7 ⁷	3.34 ¹⁶	29.1 ³	5.02 ¹⁶	30.0 ¹
31.2	36.42 ¹³⁴	56.0 ¹⁸	26.50 ²⁰	15.7 ¹⁰	3.20 ¹⁴	28.9 ²	4.87 ¹⁵	29.7 ³
	36.42 ¹²¹	56.0 ²²	26.50 ¹⁵	15.7 ¹¹	3.20 ¹²	28.9 ²	4.87 ¹²	29.7 ⁵
Apr. 10.1	35.21	53.8	26.35	14.6	3.08	28.7	4.75	29.2
20.1	34.14 ¹⁰⁷	51.2 ²⁶	26.24 ¹¹	13.4 ¹²	3.00 ⁸	28.6 ¹	4.66 ⁹	28.5 ⁷
30.1	33.24 ⁹⁰	48.3 ²⁹	26.18 ⁶	12.1 ¹³	2.96 ⁴	28.5 ¹	4.61 ⁵	27.5 ¹⁰
May 10.1	32.54 ⁷⁰	45.1 ³²	26.18 ⁰	10.8 ¹³	2.96 ⁰	28.6 ¹	4.60 ¹	26.4 ¹¹
20.0	32.05 ⁴⁹	41.7 ³⁴	26.25 ⁷	9.5 ¹³	3.01 ⁵	28.8 ²	4.63 ³	25.1 ¹³
	32.05 ²⁸	41.7 ³⁴	26.25 ¹²	9.5 ¹²	3.01 ⁹	28.8 ⁴	4.63 ⁸	25.1 ¹⁵
30.0	31.77	38.3	26.37	8.3	3.10	29.2	4.71	23.6
June 9.0	31.72 ⁵	34.8 ³⁵	26.55 ¹⁸	7.2 ¹¹	3.24 ¹⁴	29.7 ⁵	4.83 ¹²	22.0 ¹⁶
18.9	31.90 ¹⁸	31.4 ³⁴	26.78 ²³	6.4 ⁸	3.42 ¹⁸	30.3 ⁶	4.99 ¹⁶	20.3 ¹⁷
28.9	32.29 ³⁹	28.2 ³²	27.06 ²⁸	5.7 ⁷	3.64 ²²	31.0 ⁷	5.19 ²⁰	18.5 ¹⁸
July 8.9	32.89 ⁶⁰	25.2 ³⁰	27.38 ³²	5.3 ⁴	3.89 ²⁵	31.8 ⁸	5.42 ²³	16.7 ¹⁸
	32.89 ⁷⁸	25.2 ²⁷	27.38 ³⁵	5.3 ³	3.89 ²⁷	31.8 ¹⁰	5.42 ²⁵	16.7 ¹⁷
18.9	33.67	22.5	27.73	5.0	4.16	32.8	5.67	15.0
28.8	34.62 ⁹⁵	20.2 ²³	28.11 ³⁸	5.0 ⁰	4.46 ³⁰	33.7 ⁹	5.94 ²⁷	13.4 ¹⁶
Aug. 7.8	35.70 ¹⁰⁸	18.4 ¹⁸	28.50 ³⁹	5.2 ²	4.77 ³¹	34.7 ¹⁰	6.23 ²⁹	11.9 ¹⁵
17.8	36.89 ¹¹⁹	17.1 ¹³	28.91 ⁴¹	5.6 ⁴	5.08 ³¹	35.6 ⁹	6.53 ³⁰	10.6 ¹³
27.8	38.14 ¹²⁵	16.4 ⁷	29.32 ⁴¹	6.2 ⁶	5.40 ³²	36.4 ⁸	6.83 ³⁰	9.6 ¹⁰
	38.14 ¹²⁸	16.4 ⁰	29.32 ⁴⁰	6.2 ⁸	5.40 ³²	36.4 ⁸	6.83 ²⁹	9.6 ⁷
Sept. 6.7	39.42	16.4	29.72	7.0	5.72	37.2	7.12	8.9
16.7	40.67 ¹²⁵	17.0 ⁶	30.12 ⁴⁰	7.9 ⁹	6.03 ³¹	37.8 ⁶	7.41 ²⁹	8.5 ⁴
26.7	41.86 ¹¹⁹	18.1 ¹¹	30.51 ³⁹	8.9 ¹⁰	6.33 ³⁰	38.3 ⁵	7.70 ²⁹	8.5 ⁰
Oct. 6.6	42.95 ¹⁰⁹	19.9 ¹⁸	30.87 ³⁶	10.0 ¹¹	6.61 ²⁸	38.6 ³	7.96 ²⁶	8.7 ²
16.6	43.89 ⁹⁴	22.2 ²³	31.22 ³⁵	11.2 ¹²	6.88 ²⁷	38.9 ³	8.21 ²⁵	9.3 ⁶
	43.89 ⁷⁶	22.2 ²⁷	31.22 ³¹	11.2 ¹³	6.88 ²⁵	38.9 ⁰	8.21 ²³	9.3 ⁸
26.6	44.65	24.9	31.53	12.5	7.13	38.9	8.44	10.1
Nov. 5.6	45.20 ⁵⁵	28.0 ³¹	31.82 ²⁹	13.9 ¹⁴	7.35 ²²	38.9 ⁰	8.65 ²¹	11.2 ¹¹
15.5	45.51 ³¹	31.3 ³³	32.07 ²⁵	15.3 ¹⁴	7.55 ²⁰	38.8 ¹	8.83 ¹⁸	12.4 ¹²
25.5	45.58 ⁷	34.7 ³⁴	32.28 ²¹	16.7 ¹⁴	7.72 ¹⁷	38.6 ²	8.98 ¹⁵	13.8 ¹⁴
Dec. 5.5	45.39 ¹⁹	38.1 ³⁴	32.44 ¹⁶	18.1 ¹⁴	7.85 ¹³	38.3 ³	9.09 ¹¹	15.2 ¹⁴
	45.39 ⁴⁴	38.1 ³³	32.44 ¹¹	18.1 ¹⁴	7.85 ¹⁰	38.3 ³	9.09 ⁸	15.2 ¹⁵
15.5	44.95	41.4	32.55	19.5	7.95	38.0	9.17	16.7
25.4	44.28 ⁶⁷	44.4 ³⁰	32.61 ⁶	20.8 ¹³	8.00 ⁵	37.8 ²	9.21 ⁴	18.1 ¹⁴
35.4	43.39 ⁸⁹	47.1 ²⁷	32.61 ⁰	22.0 ¹²	8.01 ¹	37.5 ³	9.21 ⁰	19.4 ¹³
Sec δ , Tan δ	6.003	-5.919	1.365	+0.929	1.042	+0.293	1.002	-0.062
Mean Place	41 ^s .271	50 ["] .32	25 ^s .825	0 ["] .24	2 ^s .478	21 ["] .52	4 ^s .240	31 ["] .42
γ_{δ} , D_{δ} α	-0.14	+0.16	+0.02	-0.02	+0.01	-0.01	0.00	0.00
γ_{δ} , D_{δ} δ	+0.2	+0.9	+0.2	+0.9	+0.2	+0.9	+0.1	+0.9

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	α Doradus. Mag. 3.5		53 Eridani. Mag. 4.0		τ Tauri. Mag. 4.3		Groombrid Mag.
	Right Ascension.	Declina- tion S.	Right Ascension.	Declina- tion S.	Right Ascension.	Declina- tion N.	Right Ascension.
	h m	° '	h m	° '	h m	° '	h m
	4 32	-55 12	4 34	-14 27	4 37	+22 47	4 37
	s	"	s	"	s	"	s
Jan. 0.4	12.07	75.1	18.91	65.5	10.35	52.0	27.91
10.4	11.88 ¹⁹	77.7 ²⁶	18.88 ³	67.2 ¹⁷	10.35 ⁰	52.1 ¹	27.67 ²⁴
20.4	11.63 ²⁵	79.9 ²²	18.80 ⁸	68.7 ¹⁵	10.30 ⁵	52.1 ⁰	27.28 ³⁹
30.3	11.33 ³⁰	81.6 ¹⁷	18.70 ¹⁰	69.9 ¹²	10.21 ⁹	52.1 ⁰	26.74 ⁵⁴
Feb. 9.3	11.00 ³³	82.8 ¹²	18.56 ¹⁴	70.8 ⁹	10.08 ¹³	52.0 ¹	26.10 ⁶⁴
	36	7	17	6	15	1	73
19.3	10.64	83.5	18.39	71.4	9.93	51.9	25.37
Mar. 1.3	10.26 ³⁸	83.6 ¹	18.22 ¹⁷	71.8 ⁴	9.76 ¹⁷	51.6 ³	24.60 ⁷⁷
11.2	9.88 ³⁸	83.2 ⁴	18.04 ¹⁸	71.8 ⁰	9.59 ¹⁷	51.3 ³	23.82 ⁷⁸
21.2	9.51 ³⁷	82.2 ¹⁰	17.87 ¹⁷	71.5 ³	9.42 ¹⁷	51.0 ³	23.07 ⁷⁵
31.2	9.17 ³⁴	80.7 ¹⁵	17.71 ¹⁶	70.9 ⁶	9.27 ¹⁵	50.6 ⁴	22.39 ⁶⁸
	30	19	14	9	13	4	59
Apr. 10.1	8.87	78.8	17.57	70.0	9.14	50.2	21.80
20.1	8.61 ²⁶	76.5 ²³	17.47 ¹⁰	68.9 ¹¹	9.05 ⁹	49.8 ⁴	21.34 ⁴⁶
30.1	8.40 ²¹	73.8 ²⁷	17.40 ⁷	67.5 ¹⁴	9.00 ⁵	49.4 ⁴	21.02 ³²
May 10.1	8.26 ¹⁴	70.8 ³⁰	17.38 ²	65.8 ¹⁷	9.00 ⁰	49.1 ³	20.86 ¹⁶
20.0	8.18 ⁸	67.6 ³²	17.40 ²	63.9 ¹⁹	9.05 ⁵	49.0 ¹	20.86 ⁰
	0	34	7	20	9	1	18
30.0	8.18	64.2	17.47	61.9	9.14	48.9	21.04
June 9.0	8.24 ⁶	60.8 ³⁴	17.58 ¹¹	59.8 ²¹	9.28 ¹⁴	49.0 ¹	21.38 ³⁴
19.0	8.37 ¹³	57.4 ³⁴	17.73 ¹⁵	57.5 ²³	9.46 ¹⁸	49.3 ³	21.87 ⁴⁹
28.9	8.57 ²⁰	54.0 ³⁴	17.91 ¹⁸	55.3 ²²	9.69 ²³	49.6 ³	22.50 ⁶³
July 8.9	8.83 ²⁶	50.8 ³²	18.13 ²²	53.1 ²²	9.94 ²⁵	50.1 ⁵	23.26 ⁷⁶
	30	28	25	21	28	6	86
18.9	9.13	48.0	18.38	51.0	10.22	50.7	24.12
28.8	9.48 ³⁵	45.4 ²⁶	18.65 ²⁷	49.0 ²⁰	10.53 ³¹	51.4 ⁷	25.08 ⁹⁶
Aug. 7.8	9.87 ³⁹	43.3 ²¹	18.94 ²⁹	47.3 ¹⁷	10.85 ³²	52.1 ⁷	26.10 ¹⁰²
17.8	10.28 ⁴¹	41.8 ¹⁵	19.24 ³⁰	45.9 ¹⁴	11.18 ³³	52.8 ⁷	27.16 ¹⁰⁶
27.8	10.71 ⁴³	40.8 ¹⁰	19.54 ³⁰	44.9 ¹⁰	11.51 ³³	53.6 ⁸	28.26 ¹¹⁰
	43	4	29	7	33	7	111
Sept. 6.7	11.14	40.4	19.83	44.2	11.84	54.3	29.37
16.7	11.56 ⁴²	40.6 ²	20.13 ³⁰	43.9 ³	12.16 ³²	54.9 ⁶	30.46 ¹⁰⁹
26.7	11.97 ⁴¹	41.5 ⁹	20.41 ²⁸	44.1 ²	12.47 ³¹	55.5 ⁶	31.52 ¹⁰⁶
Oct. 6.6	12.35 ³⁸	42.9 ¹⁴	20.68 ²⁷	44.6 ⁵	12.77 ³⁰	56.0 ⁵	32.54 ¹⁰²
16.6	12.69 ³⁴	45.0 ²¹	20.93 ²⁵	45.6 ¹⁰	13.06 ²⁹	56.4 ⁴	33.49 ⁹⁵
	30	25	23	13	26	4	87
26.6	12.99	47.5	21.16	46.9	13.32	56.8	34.36
Nov. 5.6	13.23 ²⁴	50.4 ²⁹	21.36 ²⁰	48.5 ¹⁶	13.56 ²⁴	57.1 ³	35.13 ⁷⁷
15.5	13.42 ¹⁹	53.6 ³²	21.54 ¹⁸	50.3 ¹⁸	13.78 ²²	57.3 ²	35.78 ⁶⁵
25.5	13.54 ¹²	57.0 ³⁴	21.68 ¹⁴	52.3 ²⁰	13.96 ¹⁸	57.5 ²	36.29 ⁵¹
Dec. 5.5	13.59 ⁵	60.4 ³⁴	21.79 ¹¹	54.3 ²⁰	14.10 ¹⁴	57.6 ¹	36.65 ³⁶
	2	33	7	21	11	1	20
15.5	13.57 ⁸	63.7	21.86	56.4	14.21	57.7	36.85
25.4	13.49 ¹⁵	66.9 ³²	21.89 ³	58.4 ²⁰	14.27 ⁶	57.8 ¹	36.88 ³
35.4	13.34	69.8 ²⁹	21.88 ¹	60.2 ¹⁸	14.29 ²	57.9 ¹	36.74 ¹⁴
Sec δ , Tan δ	1.753	-1.440	1.033	-0.258	1.085	+0.420	4.074
Mean Place	9 ^h .519	73 ^m .84	17 ^h .155	69 ^m .75	8 ^h .495	41 ^m .21	22 ^h .320
$D'\mu\alpha$, $D_\omega\alpha$	-0.03	+0.03	-0.01	+0.01	+0.01	-0.01	+0.10
$D'\mu\delta$, $D_\omega\delta$	+0.1	+0.9	+0.1	+0.9	+0.1	+0.9	+0.1

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	α Coeli. Mag. 4.5		ϵ Camelop. Mag. 5.4		μ Eridani. Mag. 4.2		π^3 Orionis. Mag. 3.3	
	Right Ascension.	Declination S.	Right Ascension.	Declination N.	Right Ascension.	Declination S.	Right Ascension.	Declination N.
	h m 4 37 s	° ' " -42 1 "	h m 4 40 s	° ' " +56 36 "	h m 4 41 s	° ' " -3 24 "	h m 4 45 s	° ' " +6 48 "
Jan. 0.4	51.37	32.7	57.86	42.6	16.84	28.4	15.25	57.7
10.4	51.27 ¹⁰	35.3 ²⁶	57.81 ⁵	44.4 ¹⁸	16.83 ¹	29.6 ¹²	15.25 ⁰	57.0 ⁷
20.4	51.12 ¹⁵	37.4 ²¹	57.69 ¹²	46.0 ¹⁶	16.77 ⁶	30.7 ¹¹	15.20 ⁵	56.3 ⁷
30.3	50.92 ²⁰	39.1 ¹⁷	57.50 ¹⁹	47.3 ¹³	16.68 ⁹	31.7 ¹⁰	15.12 ⁸	55.7 ⁶
Feb. 9.3	50.70 ²²	40.4 ¹³	57.26 ²⁴	48.2 ⁹	16.56 ¹²	32.4 ⁷	15.01 ¹¹	55.2 ⁵
	50.70 ²⁶	40.4 ⁸	57.26 ²⁸	48.2 ⁵	16.56 ¹⁵	32.4 ⁶	15.01 ¹⁴	55.2 ⁴
19.3	50.44	41.2	56.98	48.7	16.41	33.0	14.87	54.8
Mar. 1.3	50.17 ²⁷	41.4 ²	56.67 ³¹	48.8 ¹	16.25 ¹⁶	33.3 ³	14.71 ¹⁶	54.5 ³
11.2	49.90 ²⁷	41.2 ²	56.35 ³²	48.4 ⁴	16.08 ¹⁷	33.4 ¹	14.55 ¹⁶	54.3 ²
21.2	49.64 ²⁶	40.5 ⁷	56.04 ³¹	47.7 ⁷	15.92 ¹⁶	33.4 ⁰	14.39 ¹⁶	54.2 ¹
31.2	49.39 ²⁵	39.3 ¹²	55.77 ²⁷	46.6 ¹¹	15.77 ¹⁵	33.1 ³	14.24 ¹⁵	54.2 ⁰
	49.39 ²²	39.3 ¹⁶	55.77 ²⁴	46.6 ¹⁴	15.77 ¹³	33.1 ⁵	14.24 ¹³	54.2 ¹
Apr. 10.1	49.17	37.7	55.53	45.2	15.64	32.6	14.11	54.3
20.1	48.99 ¹⁸	35.7 ²⁰	55.35 ¹⁸	43.6 ¹⁶	15.55 ⁹	31.9 ⁷	14.02 ⁹	54.6 ³
30.1	48.86 ¹³	33.4 ²³	55.24 ¹¹	41.8 ¹⁸	15.49 ⁶	31.0 ⁹	13.96 ⁶	55.0 ⁴
May 10.1	48.77 ⁹	30.7 ²⁷	55.20 ⁴	39.8 ²⁰	15.47 ²	29.9 ¹¹	13.95 ¹	55.6 ⁶
20.0	48.74 ³	27.8 ²⁹	55.24 ⁴	37.8 ²⁰	15.49 ²	28.6 ¹³	13.98 ³	56.3 ⁷
	48.74 ²	27.8 ³¹	55.24 ¹²	37.8 ¹⁹	15.49 ⁷	28.6 ¹⁴	13.98 ⁸	56.3 ⁹
30.0	48.76	24.7	55.36	35.9	15.56	27.2	14.06	57.2
June 9.0	48.84 ⁸	21.6 ³¹	55.56 ²⁰	34.1 ¹⁸	15.68 ¹²	25.6 ¹⁶	14.18 ¹²	58.2 ¹⁰
19.0	48.97 ¹³	18.4 ³²	55.82 ²⁶	32.5 ¹⁶	15.83 ¹⁵	23.9 ¹⁷	14.34 ¹⁶	59.3 ¹¹
28.9	49.15 ¹⁸	15.2 ³²	56.15 ³³	31.0 ¹⁵	16.02 ¹⁹	22.2 ¹⁷	14.53 ¹⁹	60.5 ¹²
July 8.9	49.37 ²²	12.2 ³⁰	56.54 ³⁹	29.8 ¹²	16.24 ²²	20.4 ¹⁸	14.76 ²³	61.8 ¹³
	49.37 ²⁷	12.2 ²⁸	56.54 ⁴³	29.8 ¹⁰	16.24 ²⁵	20.4 ¹⁷	14.76 ²⁶	61.8 ¹²
18.9	49.64	9.4	56.97	28.8	16.49	18.7	15.02	63.0
28.8	49.93 ²⁹	6.9 ²⁵	57.44 ⁴⁷	28.2 ⁶	16.76 ²⁷	17.1 ¹⁶	15.29 ²⁷	64.3 ¹³
Aug. 7.8	50.25 ³²	4.9 ²⁰	57.94 ⁵⁰	27.8 ⁴	17.04 ²⁸	15.7 ¹⁴	15.58 ²⁹	65.4 ¹¹
17.8	50.59 ³⁴	3.3 ¹⁶	58.45 ⁵¹	27.7 ¹	17.33 ²⁹	14.5 ¹²	15.88 ³⁰	66.5 ¹¹
27.8	50.95 ³⁶	2.2 ¹¹	58.97 ⁵²	28.0 ³	17.63 ³⁰	13.5 ¹⁰	16.18 ³⁰	67.3 ⁸
	50.95 ³⁵	2.2 ⁶	58.97 ⁵³	28.0 ⁵	17.63 ³⁰	13.5 ⁷	16.18 ³¹	67.3 ⁷
Sept. 6.7	51.30	1.6	59.50	28.5	17.93	12.8	16.49	68.0
16.7	51.64 ³⁴	1.6 ⁰	60.02 ⁵²	29.2 ⁷	18.22 ²⁹	12.4 ⁴	16.79 ³⁰	68.5 ⁵
26.7	51.98 ³⁴	2.3 ⁷	60.53 ⁵¹	30.2 ¹⁰	18.51 ²⁹	12.3 ¹	17.08 ²⁹	68.8 ³
Oct. 6.7	52.29 ³¹	3.5 ¹²	61.01 ⁴⁸	31.5 ¹³	18.78 ²⁷	12.5 ²	17.36 ²⁸	68.8 ⁰
16.6	52.58 ²⁹	5.2 ¹⁷	61.47 ⁴⁶	33.0 ¹⁵	19.03 ²⁵	13.1 ⁶	17.63 ²⁷	68.6 ²
	52.58 ²⁶	5.2 ²²	61.47 ⁴³	33.0 ¹⁶	19.03 ²⁴	13.1 ⁸	17.63 ²⁴	68.6 ⁴
26.6	52.84	7.4	61.90	34.6	19.27	13.9	17.87	68.2
Nov. 5.6	53.06 ²²	10.0 ²⁶	62.28 ³⁸	36.5 ¹⁹	19.48 ²¹	15.0 ¹¹	18.10 ²³	67.6 ⁶
15.5	53.24 ¹⁸	12.9 ²⁹	62.62 ³⁴	38.5 ²⁰	19.67 ¹⁹	16.3 ¹³	18.30 ²⁰	66.9 ⁷
25.5	53.38 ¹⁴	16.0 ³¹	62.90 ²⁸	40.5 ²⁰	19.83 ¹⁶	17.7 ¹⁴	18.47 ¹⁷	66.0 ⁹
Dec. 5.5	53.46 ⁸	19.2 ³²	63.12 ²²	42.7 ²²	19.95 ¹²	19.2 ¹⁵	18.61 ¹⁴	65.1 ⁹
	53.46 ³	19.2 ³¹	63.12 ¹⁴	42.7 ²¹	19.95 ⁹	19.2 ¹⁴	18.61 ¹⁰	65.1 ⁸
15.5	53.49	22.3	63.26	44.8	20.04	20.6	18.71	64.3
25.4	53.47 ²	25.3 ³⁰	63.34 ⁸	46.8 ²⁰	20.09 ⁵	22.1 ¹⁵	18.77 ⁶	63.4 ⁹
35.4	53.39 ⁸	28.0 ²⁷	63.33 ¹	48.7 ¹⁹	20.10 ¹	23.4 ¹³	18.79 ²	62.6 ⁸
Sec δ , Tan δ	1.346	-0.901	1.817	+1.517	1.002	-0.060	1.007	+0.120
Mean Place	49 ^s .265	33 ^{''} .14	55 ^s .036	27 ^{''} .09	15 ^s .094	34 ^{''} .58	13 ^s .471	49 ^{''} .86
$D\phi\delta$, $D\omega\alpha$	-0.02	+0.02	+0.04	-0.03	0.00	0.00	0.00	0.00
$D\phi\delta$, $D\omega\delta$	+0.1	+0.9	+0.1	+0.9	+0.1	+0.9	+0.1	+0.9

[Eph 15]

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	9 Camelop. Mag. 4.4		2 Tauri. Mag. 5.1		π ^o Orionis. Mag. 3.9		1 Aurig. Mag. 2.9	
	Right Ascension.	Declination N.	Right Ascension.	Declination N.	Right Ascension.	Declination N.	Right Ascension.	Declination N.
	h m	° '	h m	° '	h m	° '	h m	° '
	4 45	+66 11	4 46	+18 41	4 49	+ 2 18	4 51	+33 1
Jan. 0.4	39.25	75.7	25.85	55.9	51.16	15.8	29.42	69.0
10.4	39.16 9	77.9	25.85	55.7	51.16 0	14.8 10	29.42 0	69.6 6
20.4	38.98 18	79.9	25.81 4	55.6 1	51.11 5	13.9 9	29.37 5	70.1 5
30.3	38.70 28	81.5 16	25.73 8	55.4 2	51.03 8	13.2 7	29.28 9	70.5 4
Feb. 9.3	38.35 35	82.7 12	25.61 12	55.2 2	50.91 12	12.5 7	29.15 13	70.8 3
	41	8	15	2	14	4	17	1
Mar. 19.3	37.94	83.5	25.46	55.0	50.77	12.1	28.98	70.9
1.3	37.50 44	83.7 2	25.30 16	54.8 2	50.61 16	11.7 4	28.80 18	70.9 0
11.2	37.05 45	83.5 2	25.13 17	54.6 2	50.45 17	11.5 2	28.61 19	70.6 3
21.2	36.61 44	82.8 7	24.97 16	54.3 3	50.28 16	11.5 0	28.42 19	70.2 4
31.2	36.21 40	81.6 12	24.81 16	54.0 3	50.13 15	11.6 1	28.24 18	69.6 6
	35	16	12	2	12	3	15	6
Apr. 10.2	35.86	80.0	24.69	53.8	50.01	11.9	28.09	69.0
20.1	35.59 27	78.1 19	24.59 10	53.6 2	49.91 10	12.3 4	27.98 11	68.2 8
30.1	35.41 18	76.0 21	24.54 5	53.4 2	49.85 6	13.0 7	27.91 7	67.4 8
May 10.1	35.32 9	73.8 22	24.52 2	53.4 0	49.82 3	13.8 8	27.89 2	66.6 8
20.0	35.34 2	71.4 24	24.56 4	53.4 0	49.85 3	14.7 9	27.93 4	65.9 7
	12	23	8	2	6	11	8	7
June 30.0	35.46	69.1	24.64	53.6	49.91	15.8	28.01	65.2
9.0	35.68 22	66.8 23	24.77 13	53.9 3	50.02 11	17.1 13	28.15 14	64.6 6
19.0	36.00 32	64.7 21	24.94 17	54.3 4	50.17 15	18.4 13	28.34 19	64.2 4
28.9	36.41 41	62.7 20	25.15 21	54.9 6	50.36 19	19.9 15	28.56 22	63.9 3
July 8.9	36.90 49	61.1 16	25.39 24	55.5 6	50.58 22	21.3 14	28.83 27	63.8 1
	55	14	27	7	25	14	30	0
18.9	37.45	59.7	25.66	56.2	50.83	22.7	29.13	63.8
28.8	38.06 61	58.6 11	25.95 29	57.0 8	51.10 27	24.1 14	29.45 32	63.9 1
Aug. 7.8	38.70 64	57.9 7	26.25 30	57.8 8	51.38 28	25.4 13	29.79 34	64.2 3
17.8	39.38 68	57.6 3	26.57 32	58.6 8	51.67 29	26.5 11	30.14 35	64.6 4
27.8	40.07 69	57.6 0	26.89 32	59.3 7	51.97 30	27.4 9	30.50 36	65.0 4
	69	3	32	6	30	7	36	6
Sept. 6.7	40.76	57.9	27.21	59.9	52.27	28.1	30.86	65.6
16.7	41.46 70	58.6 7	27.53 32	60.5 6	52.57 30	28.6 5	31.22 36	66.2 6
26.7	42.13 67	59.7 11	27.84 31	60.9 4	52.85 28	28.7 1	31.57 35	66.8 6
Oct. 6.7	42.78 65	61.1 14	28.14 30	61.3 4	53.13 28	28.6 1	31.91 34	67.5 7
16.6	43.40 62	62.7 16	28.42 28	61.5 2	53.40 27	28.2 4	32.23 32	68.1 6
	57	19	26	1	24	6	30	7
26.6	43.97	64.6	28.68	61.6	53.64	27.6	32.53	68.8
Nov. 5.6	44.48 51	66.8 22	28.92 24	61.6 0	53.87 23	26.8 8	32.81 28	69.5 7
15.5	44.92 44	69.1 23	29.14 22	61.5 1	54.07 20	25.8 10	33.06 25	70.2 7
25.5	45.29 37	71.6 25	29.32 18	61.4 1	54.24 17	24.7 11	33.27 21	70.9 7
Dec. 5.5	45.56 27	74.2 26	29.47 15	61.3 2	54.38 14	23.5 12	33.45 18	71.6 7
	18	26	12	2	10	12	13	8
15.5	45.74 8	76.8	29.59	61.1	54.48	22.3	33.58	72.4
25.4	45.82 8	79.3 25	29.66 7	60.9 2	54.54 6	21.2 11	33.66 8	73.1 7
35.4	45.79 3	81.6 23	29.69 3	60.8 1	54.56 2	20.1 11	33.69 3	73.7 6
Sec δ, Tan δ	2.478	+2.268	1.056	+0.338	1.001	+0.040	1.193	+0.650
Mean Place	35° 54.0	59° 49'	23° 09.5	46° 04'	49° 38.0	8° 7.2	27° 34.8	57° 14'
D'ψ a, Dω a	+0.06	-0.05	+0.01	-0.01	0.00	0.00	+0.02	-0.01
Dψ δ, Dω δ	+0.1	+0.9	+0.1	+0.9	+0.1	+1.0	+0.1	+1.0

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	β Camelop. Mag. 4.2		ϵ Aurigæ. Var. 3.0-4.5		ζ Aurigæ. Mag. 3.9		ι Tauri. Mag. 4.7	
	Right Ascension.	Declination N.	Right Ascension.	Declination N.	Right Ascension.	Declination N.	Right Ascension.	Declination N.
	h m	° '	h m	° '	h m	° '	h m	° '
	4 55	+60 19	4 55	+43 41	4 56	+40 57	4 58	+21 28
Jan. 0.4	54.24	24.9	54.37	68.1	34.30	23.1	2.76	19.7
10.4	54.20 ⁴	26.9 ²⁰	54.37 ⁰	69.3 ¹²	34.30 ⁰	24.2 ¹¹	2.78 ²	19.7 ⁰
20.4	54.08 ¹²	28.7 ¹⁸	54.31 ⁶	70.4 ¹¹	34.25 ⁵	25.2 ¹⁰	2.74 ⁴	19.7 ⁰
30.3	53.89 ¹⁹	30.2 ¹⁵	54.20 ¹¹	71.2 ⁸	34.15 ¹⁰	25.9 ⁷	2.66 ⁸	19.6 ¹
Feb. 9.3	53.63 ²⁶	31.4 ¹²	54.04 ¹⁶	71.9 ⁷	34.00 ¹⁵	26.5 ⁶	2.55 ¹¹	19.6 ¹
19.3	53.32 ³¹	32.1 ⁷	53.85 ¹⁹	72.2 ³	33.81 ¹⁹	26.8 ³	2.41 ¹⁴	19.5 ¹
Mar. 1.3	52.97 ³⁵	32.4 ³	53.63 ²²	72.3 ¹	33.60 ²¹	26.9 ¹	2.24 ¹⁷	19.3 ²
11.2	52.61 ³⁶	32.3 ⁶	53.40 ²³	72.2 ¹	33.39 ²¹	26.7 ²	2.07 ¹⁷	19.1 ²
21.2	52.26 ³⁵	31.7 ⁶	53.17 ²³	71.7 ⁵	33.39 ²²	26.2 ⁵	1.90 ¹⁷	18.8 ³
31.2	51.93 ³³	30.7 ¹⁰	52.96 ²¹	70.9 ⁸	33.17 ²⁰	26.2 ⁷	1.74 ¹⁶	18.5 ³
Apr. 10.2	51.65 ²⁸	29.4 ¹³	52.78 ¹⁸	70.0 ⁹	32.97 ¹⁷	25.5 ⁹	1.60 ¹⁴	18.2 ³
20.1	51.42 ²³	27.7 ¹⁷	52.64 ¹⁴	68.9 ¹¹	32.80 ¹³	24.6 ¹⁰	1.50 ¹⁰	17.9 ³
30.1	51.27 ¹⁵	25.9 ¹⁸	52.55 ⁹	67.6 ¹³	32.67 ⁹	23.6 ¹¹	1.43 ⁷	17.7 ²
May 10.1	51.20 ⁷	23.9 ²⁰	52.52 ³	66.3 ¹³	32.58 ³	22.5 ¹²	1.41 ²	17.5 ²
20.0	51.21 ¹	21.8 ²¹	52.55 ³	65.0 ¹³	32.58 ³	21.3 ¹¹	1.44 ³	17.4 ¹
30.0	51.30 ⁹	19.7 ²¹	52.64 ⁹	63.7 ¹³	32.58 ⁹	20.2 ¹¹	1.51 ⁷	17.3 ¹
June 9.0	51.48 ¹⁸	17.6 ²¹	52.78 ¹⁴	62.5 ¹²	32.67 ¹⁴	19.1 ¹¹	1.63 ¹²	17.4 ¹
19.0	51.74 ²⁶	15.7 ¹⁹	52.98 ²⁰	61.5 ¹⁰	32.81 ¹⁴	18.0 ¹¹	1.63 ¹²	17.4 ¹
28.9	51.74 ²⁶	15.7 ¹⁹	52.98 ²⁰	61.5 ¹⁰	33.00 ¹⁹	17.1 ⁹	1.79 ¹⁶	17.7 ³
July 8.9	52.07 ³³	14.0 ¹⁷	53.23 ²⁵	60.6 ⁹	33.24 ²⁴	16.4 ⁷	1.99 ²⁰	18.0 ³
18.9	52.47 ⁴⁰	12.5 ¹⁵	53.53 ³⁰	59.9 ⁷	33.24 ²⁴	16.4 ⁷	1.99 ²⁰	18.0 ³
28.9	52.92 ⁵⁰	11.2 ¹⁰	53.86 ³⁷	59.3 ³	33.53 ²⁹	15.8 ⁶	2.23 ²⁴	18.4 ⁴
Aug. 7.8	53.42 ⁵⁰	10.2 ¹⁰	54.23 ³⁷	59.0 ³	33.53 ³²	15.4 ⁴	2.50 ²⁷	18.9 ⁵
17.8	53.95 ⁵³	9.6 ⁶	54.61 ³⁸	58.9 ¹	33.85 ³⁵	15.4 ³	2.50 ²⁷	18.9 ⁵
27.8	54.51 ⁵⁶	9.2 ⁴	55.01 ⁴⁰	58.9 ⁰	34.20 ³⁵	15.1 ³	2.79 ²⁹	19.5 ⁶
Sept. 6.7	55.08 ⁵⁷	9.2 ⁰	55.42 ⁴¹	59.2 ³	34.57 ³⁷	15.1 ⁰	3.09 ³⁰	20.2 ⁷
16.7	55.66 ⁵⁸	9.4 ⁶	55.83 ⁴¹	59.2 ⁴	34.95 ³⁸	15.2 ¹	3.41 ³²	20.8 ⁶
26.7	56.24 ⁵⁸	10.0 ⁸	56.24 ⁴⁰	60.2 ⁶	35.35 ⁴⁰	15.5 ³	3.74 ³³	21.4 ⁶
Oct. 6.7	56.81 ⁵⁷	10.8 ⁸	56.64 ⁴⁰	60.9 ⁷	35.74 ⁴⁰	15.9 ⁶	4.06 ³³	21.9 ⁵
16.6	57.36 ⁵⁵	11.9 ¹¹	57.03 ³⁹	61.7 ⁸	36.14 ⁴⁰	16.5 ⁶	4.39 ³³	22.4 ⁵
26.6	57.88 ⁵²	13.3 ¹⁴	57.40 ³⁷	62.6 ⁹	36.52 ³⁸	17.1 ⁶	4.70 ³¹	22.8 ⁴
Nov. 5.6	58.36 ⁴⁵	14.9 ¹⁹	57.75 ³²	63.7 ¹¹	36.90 ³⁸	17.9 ⁸	5.01 ³¹	23.2 ⁴
15.6	58.81 ³⁹	16.8 ¹⁹	58.07 ³²	64.8 ¹¹	37.26 ³⁶	18.8 ⁹	5.30 ²⁹	23.4 ²
25.5	59.20 ³³	18.8 ²⁰	58.36 ²⁹	66.1 ¹³	37.59 ³¹	19.7 ¹⁰	5.58 ²⁶	23.5 ¹
Dec. 5.5	59.53 ³³	20.9 ²¹	58.61 ²⁵	67.4 ¹³	38.00 ²⁸	20.7 ¹⁰	5.84 ²³	23.6 ¹
15.5	59.79 ¹⁸	23.2 ²³	58.81 ²⁰	68.7 ¹³	38.18 ²⁸	21.8 ¹¹	6.07 ²³	23.6 ⁰
25.4	60.07 ¹⁰	27.6 ²²	59.05 ⁹	71.4 ¹³	38.42 ²⁴	23.0 ¹²	6.27 ²⁰	23.6 ⁰
35.4	60.09 ²	29.8 ²²	59.09 ⁴	72.6 ¹²	38.62 ²⁰	24.2 ¹²	6.43 ¹⁶	23.6 ⁰
Sec δ , Tan δ	2.020	+1.755	1.383	+0.956	1.324	+0.868	1.075	+0.393
Mean Place	51°.023	10°.05	52°.017	55°.08	32°.023	10°.53	0°.837	9°.83
D^*a , $D_{\infty}a$	+0.05	-0.03	+0.02	-0.02	+0.02	-0.02	+0.01	-0.01
D^*d , $D_{\infty}d$	+0.1	+1.0	+0.1	+1.0	+0.1	+1.0	+0.1	+1.0

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	11 Orionis. Mag. 4.6		11 Aurigæ. Mag. 3.3		ε Leporis. Mag. 3.3		β Eridani. Mag. 2.0	
	Right Ascension.	Declination N.	Right Ascension.	Declination N.	Right Ascension.	Declination S.	Right Ascension.	Declination S.
	h m 4 59	° ' " +15 17	h m 5 0	° ' " +41 7	h m 5 1	° ' " -22 28	h m 5 3	° ' " -5 11
Jan. 0.4	44.52	20.9	35.42	26.6	53.59	60.5	42.05	37.7
10.4	44.53	20.5	35.43	27.7	53.57	62.7	42.05	39.1
20.4	44.50	20.2	35.38	28.6	53.50	64.6	42.01	40.4
30.4	44.43	19.9	35.28	29.4	53.39	66.2	41.93	41.5
Feb. 9.3	44.32	19.7	35.13	30.0	53.25	67.4	41.82	42.3
19.3	44.18	19.4	34.95	30.4	53.08	68.3	41.67	43.0
Mar. 1.3	44.02	19.2	34.74	30.5	52.89	68.8	41.51	43.4
11.2	43.85	19.0	34.52	30.3	52.69	69.0	41.34	43.6
21.2	43.69	18.8	34.30	29.9	52.50	68.8	41.17	43.6
31.2	43.53	18.6	34.10	29.2	52.31	68.2	41.01	43.3
Apr. 10.2	43.40	18.5	33.93	28.4	52.14	67.3	40.87	42.8
20.1	43.30	18.5	33.79	27.4	52.01	66.0	40.76	42.1
30.1	43.23	18.5	33.70	26.3	51.91	64.4	40.68	41.2
May 10.1	43.21	18.6	33.67	25.1	51.85	62.5	40.64	40.1
20.1	43.23	18.8	33.69	23.9	51.83	60.4	40.65	38.8
30.0	43.30	19.2	33.77	22.8	51.86	58.1	40.70	37.3
June 9.0	43.41	19.6	33.91	21.7	51.94	55.7	40.79	35.7
19.0	43.56	20.2	34.10	20.8	52.06	53.2	40.92	34.0
28.9	43.75	20.9	34.34	20.0	52.22	50.7	41.09	32.3
July 8.9	43.98	21.6	34.62	19.4	52.41	48.2	41.29	30.5
18.9	44.23	22.5	34.94	18.9	52.64	45.8	41.52	28.8
28.9	44.51	23.3	35.29	18.6	52.89	43.6	41.77	27.2
Aug. 7.8	44.80	24.1	35.66	18.5	53.17	41.7	42.04	25.7
17.8	45.11	24.9	36.04	18.6	53.46	40.2	42.33	24.5
27.8	45.42	25.6	36.43	18.9	53.76	39.0	42.62	23.5
Sept. 6.7	45.73	26.2	36.83	19.2	54.07	38.2	42.92	22.8
16.7	46.05	26.6	37.22	19.7	54.37	37.9	43.21	22.4
26.7	46.35	27.0	37.61	20.3	54.67	38.2	43.50	22.4
Oct. 6.7	46.65	27.1	37.99	21.0	54.95	38.9	43.78	22.7
16.6	46.93	27.1	38.35	21.9	55.22	40.0	44.05	23.4
26.6	47.20	27.0	38.69	22.8	55.48	41.6	44.30	24.3
Nov. 5.6	47.45	26.8	39.01	23.8	55.70	43.5	44.53	25.5
15.6	47.67	26.5	39.29	24.8	55.90	45.7	44.74	26.9
25.5	47.87	26.1	39.53	26.0	56.07	48.1	44.91	28.5
Dec. 5.5	48.03	25.6	39.74	27.1	56.20	50.6	45.06	30.2
15.5	48.15	25.2	39.89	28.3	56.29	53.1	45.17	31.8
25.4	48.23	24.8	39.99	29.5	56.34	55.6	45.23	33.4
35.4	48.27	24.4	40.03	30.6	56.34	57.9	45.26	34.9
Sec δ, Tan δ	1.037	+0.273	1.328	+0.873	1.082	-0.414	1.004	-0.091
Mean Place	42° 65' 0"	11° 06'	33° 11' 17"	14° 19'	51° 735	64° 16'	40° 249	43° 62'
D'φ α, D _ω α	+0.01	0.00	+0.02	-0.02	-0.01	+0.01	0.00	0.00
D'φ δ, D _ω δ	+0.1	+1.0	+0.1	+1.0	+0.1	+1.0	+0.1	+1.0

[Eph 15]

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	μ Aurigæ. Mag. 4.8		19 H. Camelop. Mag. 5.2		μ Leporis. Mag. 3.3		α Aurigæ. (Capella.) Mag. 0.2	
	Right Ascension.	Declination N.	Right Ascension.	Declination N.	Right Ascension.	Declination S.	Right Ascension.	Declination N.
	h m 5 7	° ' " +38 23	h m 5 8	° ' " +79 8	h m 5 9	° ' " -16 17	h m 5 10	° ' " +45 54
Jan. 0.4	38.80 ^s	17.2 ["]	39.43 ^s	25.1 ["]	8.61 ^s	74.7 ["]	26.96 ^s	58.2 ["]
10.4	38.82 ²	18.2 ¹⁰	39.24 ¹⁹	28.0 ²⁹	8.60 ¹	76.7 ²⁰	26.98 ²	59.6 ¹⁴
20.4	38.78 ⁴	19.0 ⁸	38.82 ⁴²	30.6 ²⁶	8.55 ⁵	78.4 ¹⁷	26.93 ⁵	60.8 ¹²
30.4	38.69 ⁹	19.7 ⁷	38.21 ⁶¹	32.8 ²²	8.46 ⁹	79.8 ¹⁴	26.82 ¹¹	61.8 ¹⁰
Feb. 9.3	38.56 ¹³	20.3 ⁶	37.43 ⁷⁸	34.5 ¹⁷	8.33 ¹³	81.0 ¹²	26.67 ¹⁵	62.6 ⁸
19.3	38.39 ¹⁷	20.6 ³	36.52 ⁹¹	35.8 ¹³	8.17 ¹⁶	81.9 ⁹	26.47 ²⁰	63.1 ⁵
Mar. 1.3	38.19 ²⁰	20.7 ¹	35.52 ¹⁰⁰	36.5 ⁷	8.00 ¹⁷	82.4 ⁵	26.25 ²²	63.4 ³
11.2	37.98 ²¹	20.6 ¹	34.48 ¹⁰⁴	36.6 ¹	7.82 ¹⁸	82.6 ²	26.01 ²⁴	63.3 ¹
21.2	37.77 ²¹	20.2 ⁴	33.45 ¹⁰³	36.2 ⁴	7.63 ¹⁹	82.5 ¹	25.77 ²⁴	62.9 ⁴
31.2	37.57 ²⁰	19.7 ⁵	32.48 ⁹⁷	35.2 ¹⁰	7.45 ¹⁸	82.1 ⁴	25.54 ²³	62.3 ⁶
Apr. 10.2	37.40 ¹⁷	19.0 ⁷	31.61 ⁸⁷	33.7 ¹⁵	7.30 ¹⁵	81.3 ⁸	25.34 ²⁰	61.4 ⁹
20.1	37.27 ¹³	18.1 ⁹	30.88 ⁷³	31.7 ²⁰	7.17 ¹³	80.3 ¹⁰	25.18 ¹⁶	60.3 ¹¹
30.1	37.18 ⁹	17.1 ¹⁰	30.32 ⁵⁶	29.4 ²³	7.07 ¹⁰	79.0 ¹³	25.08 ¹⁰	59.0 ¹³
May 10.1	37.14 ⁴	16.1 ¹⁰	29.95 ³⁷	26.9 ²⁵	7.02 ⁵	77.4 ¹⁶	25.02 ⁶	57.6 ¹⁴
20.1	37.16 ²	15.0 ¹¹	29.78 ¹⁷	24.1 ²⁸	7.00 ²	75.6 ¹⁸	25.03 ¹	56.2 ¹⁴
30.0	37.23 ⁷	14.0 ¹⁰	29.83 ⁵	21.3 ²⁸	7.03 ³	73.6 ²⁰	25.10 ⁷	54.8 ¹⁴
June 9.0	37.35 ¹²	13.1 ⁹	30.09 ²⁶	18.5 ²⁸	7.11 ⁸	71.5 ²¹	25.23 ¹³	53.5 ¹³
19.0	37.53 ¹⁸	12.3 ⁸	30.55 ⁴⁶	15.8 ²⁷	7.23 ¹²	69.3 ²²	25.42 ¹⁹	52.2 ¹³
28.9	37.75 ²²	11.6 ⁷	31.21 ⁶⁶	13.2 ²⁶	7.38 ¹⁵	67.0 ²³	25.66 ²⁴	51.1 ¹¹
July 8.9	38.02 ²⁷	11.1 ⁵	32.05 ⁸⁴	10.9 ²³	7.58 ²⁰	64.8 ²²	25.95 ²⁹	50.1 ¹⁰
18.9	38.32 ³⁰	10.7 ⁴	33.04 ⁹⁹	8.8 ²¹	7.80 ²²	62.6 ²²	26.28 ³³	49.4 ⁷
28.9	38.65 ³³	10.5 ²	34.17 ¹¹³	7.1 ¹⁷	8.05 ²⁵	60.6 ²⁰	26.64 ³⁶	48.8 ⁶
Aug. 7.8	39.00 ³⁵	10.5 ⁰	35.41 ¹²⁴	5.7 ¹⁴	8.32 ²⁷	58.8 ¹⁸	27.03 ³⁹	48.4 ⁴
17.8	39.37 ³⁷	10.6 ¹	36.73 ¹³²	4.8 ⁹	8.60 ²⁸	57.3 ¹⁵	27.44 ⁴¹	48.2 ²
27.8	39.75 ³⁸	10.8 ²	38.11 ¹³⁸	4.2 ⁶	8.89 ²⁹	56.2 ¹¹	27.86 ⁴²	48.2 ⁰
Sept. 6.8	40.13 ³⁸	11.1 ³	39.53 ¹⁴²	4.1 ¹	9.19 ³⁰	55.4 ⁸	28.28 ⁴²	48.4 ²
16.7	40.51 ³⁸	11.5 ⁴	40.96 ¹⁴³	4.4 ³	9.49 ³⁰	55.1 ³	28.71 ⁴³	48.8 ⁴
26.7	40.89 ³⁸	12.0 ⁵	42.38 ¹⁴²	5.1 ⁷	9.78 ²⁹	55.2 ¹	29.13 ⁴²	49.3 ⁵
Oct. 6.7	41.26 ³⁷	12.6 ⁶	43.76 ¹³⁸	6.3 ¹²	10.07 ²⁹	55.8 ⁶	29.54 ⁴¹	50.0 ⁷
16.6	41.61 ³⁵	13.2 ⁶	45.07 ¹³¹	7.8 ¹⁵	10.34 ²⁷	56.8 ¹⁰	29.94 ⁴⁰	50.8 ⁸
26.6	41.94 ³³	14.0 ⁸	46.29 ¹²²	9.7 ¹⁹	10.59 ²⁵	58.1 ¹³	30.31 ³⁷	51.8 ¹⁰
Nov. 5.6	42.25 ³¹	14.8 ⁸	47.39 ¹¹⁰	12.0 ²³	10.82 ²³	59.8 ¹⁷	30.66 ³⁵	51.8 ¹¹
15.6	42.53 ²⁸	15.7 ⁹	48.35 ⁹⁶	14.5 ²⁵	11.03 ²¹	61.7 ¹⁹	30.97 ³¹	54.1 ¹²
25.5	42.78 ²⁵	16.6 ⁹	49.14 ⁷⁹	17.3 ²⁸	11.21 ¹⁸	63.8 ²¹	31.25 ²⁸	55.5 ¹⁴
Dec. 5.5	42.98 ¹⁶	17.5 ¹⁰	49.74 ⁶⁰	20.3 ³⁰	11.35 ¹⁴	66.1 ²³	31.47 ²²	56.9 ¹⁴
15.5	43.14 ¹⁰	18.5 ¹⁰	50.12 ¹⁷	23.3 ³⁰	11.45 ⁶	68.3 ²²	31.65 ¹¹	58.3 ¹⁴
25.5	43.24 ⁶	19.5 ¹⁰	50.29 ⁶	26.3 ³⁰	11.51 ²	70.5 ²¹	31.76 ⁵	59.7 ¹⁴
35.4	43.30	20.5	50.23	29.3 ³⁰	11.53	72.6	31.81	61.1 ¹⁴
Sec δ, Tan δ	1.276	+0.792	5.307	+5.212	1.042	-0.292	1.437	+1.032
Mean Place	36°.538	5''.59	31°.512	10''.01	6°.773	79''.23	24°.448	45''.93
D' ϕ a, D_a a	+0.02	-0.01	+0.13	-0.08	-0.01	0.00	+0.03	-0.01
D_a δ, D_a δ	+0.1	+1.0	+0.1	+1.0	+0.1	+1.0	+0.1	+1.0

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	β Orionis. (Rigel.) Mag. 0.3		λ Aurigæ. Mag. 4.8		τ Orionis. Mag. 3.7		σ Colum. Mag. 4	
	Right Ascension.	Declination S.	Right Ascension.	Declination N.	Right Ascension.	Declination S.	Right Ascension.	
	h m 5 10	° ' " — 8 17	h m 5 13	° ' " +40 1	h m 5 13	° ' " — 6 55	h m 5 14	
Jan. 0.4	28.94	51.0	11.92	40.3	30.55	61.9	26.99	
10.4	28.95	52.6	11.94	41.3	30.56	63.4	26.95	
20.4	28.91	54.0	11.91	42.3	30.52	64.8	26.86	
30.4	28.83	55.2	11.82	43.1	30.44	65.9	26.72	
Feb. 9.3	28.71	56.1	11.69	43.7	30.33	66.9	26.55	
19.3	28.57	56.9	11.52	44.1	30.19	67.6	26.34	
Mar. 1.3	28.41	57.4	11.32	44.2	30.03	68.0	26.11	
11.2	28.24	57.6	11.11	44.1	29.86	68.3	25.87	
21.2	28.06	57.5	10.89	43.8	29.69	68.3	25.63	
31.2	27.90	57.2	10.69	43.3	29.52	68.0	25.40	
Apr. 10.2	27.75	56.7	10.51	42.5	29.37	67.5	25.19	
20.1	27.63	55.9	10.37	41.6	29.25	66.8	25.01	
30.1	27.54	54.9	10.27	40.5	29.17	65.9	24.87	
May 10.1	27.50	53.7	10.23	39.4	29.12	64.7	24.77	
20.1	27.49	52.2	10.24	38.3	29.11	63.4	24.72	
30.0	27.53	50.6	10.30	37.2	29.15	61.8	24.71	
June 9.0	27.61	48.9	10.42	36.2	29.23	60.2	24.76	
19.0	27.73	47.0	10.60	35.2	29.35	58.4	24.85	
28.9	27.89	45.2	10.83	34.4	29.51	56.6	24.99	
July 8.9	28.09	43.3	11.09	33.7	29.70	54.8	25.18	
18.9	28.31	41.4	11.39	33.2	29.93	53.0	25.40	
28.9	28.56	39.7	11.73	32.9	30.17	51.3	25.65	
Aug. 7.8	28.83	38.1	12.09	32.7	30.44	49.8	25.93	
17.8	29.11	36.8	12.46	32.6	30.72	48.5	26.23	
27.8	29.40	35.8	12.84	32.7	31.01	47.5	26.55	
Sept. 6.8	29.70	35.1	13.23	33.0	31.31	46.8	26.88	
16.7	29.99	34.7	13.63	33.3	31.60	46.5	27.20	
26.7	30.28	34.8	14.01	33.7	31.89	46.5	27.53	
Oct. 6.7	30.57	35.2	14.39	34.3	32.17	46.8	27.84	
16.6	30.84	35.9	14.76	34.9	32.45	47.5	28.14	
26.6	31.09	36.9	15.11	35.7	32.70	48.6	28.42	
Nov. 5.6	31.33	38.3	15.43	36.5	32.94	49.9	28.67	
15.6	31.54	39.9	15.72	37.4	33.16	51.4	28.88	
25.5	31.72	41.6	15.98	38.3	33.34	53.1	29.06	
Dec. 5.5	31.87	43.4	16.20	39.3	33.49	54.8	29.19	
15.5	31.98	45.3	16.36	40.4	33.61	56.6	29.28	
25.5	32.05	47.1	16.48	41.5	33.68	58.3	29.32	
35.4	32.08	48.8	16.54	42.5	33.72	60.0	29.31	
Sec δ , Tan δ	1.011	-0.146	1.306	+0.840	1.007	-0.122	1.220	-
Mean Place	27 ^h .127	56 ^m .44	9 ^h .585	28 ^m .81	28 ^h .726	67 ^m .54	24 ^h .975	40 ^m
D ψ α , D ω α	0.00	0.00	+0.02	-0.01	0.00	0.00	-0.02	+1
D ψ δ , D ω δ	+0.1	+1.0	+0.1	+1.0	+0.1	+1.0	+0.1	+1

(Eph 15)

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	γ Orionis. (Bellatrix.) Mag. 1.7		β Tauri. Mag. 1.8		17 Camelop. Mag. 5.8		β Leporis. Mag. 3.0	
	Right Ascension.	Declination N.	Right Ascension.	Declination N.	Right Ascension.	Declination N.	Right Ascension.	Declination S.
	h m	° '	h m	° '	h m	° '	h m	° '
	5 20	+ 6 16	5 20	+ 28 32	5 22	+ 62 59	5 24	- 20 49
	s	"	s	"	s	"	s	"
Jan. 0.4	36.15	32.0	57.16	21.9	12.03	64.6	38.08	30.9
10.4	36.17	31.1	57.20	22.3	12.04	66.8	38.08	33.1
20.4	36.15	30.3	57.18	22.6	11.95	68.9	38.03	35.1
30.4	36.09	29.6	57.11	22.9	11.77	70.7	37.94	36.8
Feb. 9.3	35.99	29.1	57.01	23.2	11.51	72.1	37.81	38.1
19.3	35.86	28.7	56.86	23.3	11.18	73.2	37.66	39.2
Mar. 1.3	35.71	28.3	56.69	23.4	10.81	73.9	37.48	39.9
11.3	35.55	28.1	56.51	23.3	10.42	74.0	37.28	40.2
21.2	35.38	28.0	56.33	23.1	10.03	73.7	37.08	40.2
31.2	35.22	28.1	56.15	22.7	9.65	73.0	36.89	39.8
Apr. 10.2	35.08	28.2	55.99	22.3	9.31	71.9	36.72	39.0
20.1	34.96	28.5	55.87	21.8	9.02	70.4	36.57	37.9
30.1	34.88	28.9	55.78	21.3	8.80	68.6	36.46	36.6
May 10.1	34.84	29.4	55.73	20.8	8.67	66.6	36.38	34.9
20.1	34.83	30.1	55.74	20.3	8.63	64.5	36.35	33.0
30.0	34.88	30.9	55.79	19.8	8.67	62.3	36.36	30.9
June 9.0	34.96	31.8	55.89	19.4	8.81	60.0	36.42	28.6
19.0	35.09	32.8	56.04	19.2	9.03	57.9	36.52	26.2
29.0	35.25	33.9	56.23	19.0	9.34	55.9	36.65	23.8
July 8.9	35.45	35.1	56.46	18.9	9.72	54.0	36.83	21.4
18.9	35.68	36.2	56.72	18.9	10.17	52.4	37.04	19.1
28.9	35.93	37.3	57.01	19.0	10.67	51.1	37.28	17.0
Aug. 7.8	36.20	38.4	57.32	19.2	11.21	50.0	37.54	15.1
17.8	36.49	39.3	57.65	19.4	11.79	49.2	37.82	13.5
27.8	36.78	40.0	57.99	19.7	12.40	48.7	38.11	12.2
Sept. 6.8	37.08	40.6	58.33	20.0	13.02	48.5	38.41	11.4
16.7	37.38	41.0	58.67	20.3	13.65	48.7	38.71	11.1
26.7	37.68	41.1	59.01	20.6	14.28	49.2	39.01	11.2
Oct. 6.7	37.97	41.0	59.35	20.9	14.89	49.9	39.30	11.8
16.7	38.25	40.6	59.67	21.1	15.48	51.0	39.58	12.8
26.6	38.52	40.0	59.98	21.4	16.04	52.4	39.85	14.3
Nov. 5.6	38.77	39.3	60.27	21.6	16.56	54.0	40.10	16.1
15.6	39.01	38.4	60.54	21.9	17.03	55.9	40.32	18.2
25.5	39.21	37.4	60.78	22.2	17.44	57.9	40.51	20.6
Dec. 5.5	39.38	36.4	60.97	22.5	17.77	60.1	40.66	23.1
15.5	39.51	35.4	61.13	22.8	18.02	62.4	40.77	25.6
25.5	39.61	34.3	61.25	23.2	18.18	64.8	40.84	28.1
35.4	39.66	33.4	61.31	23.6	18.24	67.1	40.87	30.4
Sec δ , Tan δ	1.006	+0.110	1.138	+0.544	2.203	+1.963	1.070	-0.380
Mean Place	34 ^h .277	24 ^m .75	55 ^h .053	12 ^m .08	8 ^h .323	51 ^m .64	36 ^h .199	35 ^m .17
D ϕ δ , D ω α	0.00	0.00	+0.01	-0.01	+0.05	-0.02	-0.01	0.00
D ϕ δ , D ω δ	+0.1	+1.0	+0.1	+1.0	+0.1	+1.0	+0.1	+1.0

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	χ Aurigæ. Mag. 4.9		δ Orionis. Mag. 2.5		Groombridge 908. Mag. 6.4		α Leporis. Mag. 2.7	
	Right Ascension.	Declination N.	Right Ascension.	Declination S.	Right Ascension.	Declination N.	Right Ascension.	Declination S.
	h m	° '	h m	° '	h m	° '	h m	° '
	5 27	+32 7	5 27	- 0 21	5 28	+74 59	5 28	-17 52
Jan. 0.5	13.86	58.4	41.67	34.0	27.27	36.0	60.74	52.0
10.4	13.90 ⁴	59.1 ⁷	41.69 ²	35.2 ¹²	27.23 ⁴	38.8 ²⁸	60.74 ⁰	54.1 ²¹
20.4	13.89 ¹	59.6 ⁵	41.67 ²	36.3 ¹⁰	27.02 ²¹	41.3 ²⁵	60.70 ⁴	56.0 ¹⁹
30.4	13.83	60.1 ⁵	41.61 ⁶	37.3 ¹¹	26.66 ³⁶	43.6 ²³	60.62 ⁸	57.6 ¹⁶
Feb. 9.3	13.72 ¹¹	60.5 ⁴	41.51 ¹⁰	38.1 ⁸	26.16 ⁵⁰	45.4 ¹⁸	60.50 ¹²	59.0 ¹⁴
19.3	13.72 ¹⁵	60.5 ³	41.51 ¹³	38.1 ⁶	26.16 ⁶¹	45.4 ¹⁴	60.50 ¹⁵	59.0 ¹⁰
Mar. 1.3	13.57	60.8	41.38	38.7	25.55	46.8	60.35	60.0
11.3	13.40 ¹⁷	61.0 ²	41.23 ¹⁵	39.1 ⁴	24.86 ⁶⁹	47.7 ⁹	60.18 ¹⁷	60.7 ⁷
21.2	13.21 ¹⁹	61.0 ⁰	41.07 ¹⁶	39.4 ³	24.13 ⁷³	48.1 ⁴	59.99 ¹⁹	61.0 ³
31.2	13.01 ²⁰	60.8 ²	40.90 ¹⁷	39.4 ⁰	23.39 ⁷⁴	47.9 ²	59.80 ¹⁹	61.0 ⁰
Apr. 10.2	12.83 ¹⁸	60.4 ⁴	40.74 ¹⁶	39.3 ¹	22.68 ⁷¹	47.1 ⁸	59.62 ¹⁸	60.7 ³
20.2	12.66	60.0	40.59	39.0	22.04	45.9	59.45	60.0
30.1	12.52 ¹⁴	59.4 ⁶	40.47 ¹²	38.6 ⁴	21.48 ⁵⁶	44.2 ¹⁷	59.31 ¹⁴	59.1 ⁹
May 10.1	12.43 ⁹	58.8 ⁶	40.38 ⁹	37.9 ⁷	21.04 ⁴⁴	42.2 ²⁰	59.19 ¹²	57.8 ¹³
20.1	12.38 ⁵	58.1 ⁷	40.32 ⁶	37.1 ⁸	20.73 ³¹	39.9 ²³	59.12 ⁷	56.3 ¹⁵
30.0	12.37 ¹	57.4 ⁷	40.31 ¹	36.1 ¹⁰	20.57 ¹⁶	37.3 ²⁶	59.09 ³	54.5 ¹⁸
June 9.0	12.42 ¹⁰	56.7 ⁶	40.34 ⁸	34.9 ¹²	20.56	34.7	59.10	52.5
19.0	12.52 ¹⁵	56.1 ⁶	40.42 ⁸	33.7 ¹²	20.71 ¹⁵	32.0 ²⁷	59.15 ⁵	50.4 ²¹
29.0	12.67 ¹⁵	55.6 ⁵	40.53 ¹¹	32.3 ¹⁴	21.01 ³⁰	29.3 ²⁷	59.25 ¹⁰	48.1 ²³
July 8.9	12.86 ¹⁹	55.2 ⁴	40.68 ¹⁵	30.9 ¹⁴	21.45 ⁴⁴	26.7 ²⁶	59.39 ¹⁴	45.9 ²²
18.9	13.09 ²³	54.9 ³	40.87 ¹⁹	29.4 ¹⁵	22.02 ⁵⁷	24.4 ²³	59.56 ¹⁷	43.6 ²³
28.9	13.35 ³⁰	54.7 ¹	41.08 ²⁴	28.0 ¹⁴	22.72 ⁸⁰	22.2 ¹⁸	59.77 ²³	41.4 ²⁰
Aug. 7.8	13.65 ³¹	54.6 ⁰	41.32 ²⁶	26.6 ¹²	23.52 ⁸⁸	20.4 ¹⁶	60.00 ²⁵	39.4 ¹⁰
17.8	13.96 ³⁴	54.6 ⁰	41.58 ²⁸	25.4 ¹¹	24.40 ⁹⁶	18.8 ¹¹	60.25 ²⁸	37.5 ¹⁵
27.8	14.30 ³⁴	54.6 ⁰	41.86 ²⁹	24.3 ⁹	25.36 ¹⁰¹	17.7 ⁸	60.53 ²⁹	36.0 ¹²
Sept. 6.8	14.64 ³⁵	54.8 ²	42.15 ²⁹	23.4 ⁶	26.37 ¹⁰⁴	16.9 ⁴	60.82 ²⁹	34.8 ⁸
16.7	14.99 ³⁶	55.0 ²	42.44 ³⁰	22.8 ⁴	27.41 ¹⁰⁶	16.5 ⁰	61.11 ³⁰	34.0 ⁴
26.7	15.35 ³⁶	55.2 ²	42.74 ³⁰	22.4 ⁰	28.47 ¹⁰⁶	16.5 ⁴	61.41 ³⁰	33.6 ¹
Oct. 6.7	15.71 ³⁶	55.5 ³	43.04 ²⁹	22.4 ²	29.53 ¹⁰⁴	16.9 ⁸	61.71 ³⁰	33.7 ⁵
16.7	16.06 ³⁴	55.8 ³	43.33 ²⁸	22.6 ⁸	30.57 ¹⁰⁰	17.7 ¹²	62.00 ²⁸	34.2 ⁹
26.6	16.40 ³²	56.1 ³	43.61 ²⁶	23.2 ⁶	31.57 ⁹⁵	18.9 ¹⁵	62.28 ²⁷	35.1 ¹⁴
Nov. 5.6	16.72 ³¹	56.4 ⁴	43.87 ²⁵	24.0 ¹⁰	32.52 ⁸⁸	20.4 ¹⁹	62.55 ²⁵	36.5 ¹⁷
15.6	17.03 ²⁸	56.8 ⁴	44.12 ²³	25.0 ¹³	33.40 ⁷⁸	22.3 ²⁵	62.80 ²³	38.2 ²⁰
25.5	17.31 ²⁵	57.2 ⁴	44.35 ²¹	26.3 ¹³	34.18 ⁶⁶	24.5 ²⁸	63.03 ¹⁹	40.2 ²³
Dec. 5.5	17.56 ²¹	57.6 ⁴	44.56 ¹⁷	27.6 ¹⁵	34.84 ⁵⁴	27.0 ²⁷	63.22 ¹⁶	42.5 ²³
15.5	17.77 ¹⁷	58.1 ⁵	44.73 ¹³	29.1 ¹⁴	35.38 ³⁸	29.7 ²⁸	63.38 ¹²	44.8 ²⁴
25.5	17.94 ¹³	58.7 ⁶	44.86 ¹⁰	30.5 ¹⁵	35.76 ²³	32.5 ²⁸	63.50 ⁸	47.2 ²⁴
35.4	18.07 ⁷	59.3 ⁵	44.96 ⁵	32.0 ¹³	35.99 ⁶	35.3 ²⁸	63.58 ³	49.6 ²²
See δ , Tan δ	1.181	+0.628	1.000	-0.006	3.862	+3.730	1.051	-0.323
Mean Place	11 ^h .663	48 ^m .64	39 ^h .809	40 ^m .31	21 ^h .045	22 ^m .90	58 ^h .865	56 ^m .65
$D'\psi\alpha$, $D\psi\alpha$	+0.02	-0.01	0.00	0.00	+0.10	-0.03	-0.01	0.00
$D'\psi\delta$, $D\psi\delta$	+0.1	+1.0	+0.1	+1.0	+0.1	+1.0	+0.1	+1.0

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	♂ Orionis. Mag. 4.5		♂ Orionis. Mag. 2.9		♂ Orionis. Mag. 1.8		♂ Tauri. Mag. 3.0	
	Right Ascension.	Declination N.	Right Ascension.	Declination S.	Right Ascension.	Declination S.	Right Ascension.	Declination N.
	h m	° '	h m	° '	h m	° '	h m	° '
	5 30	+ 9 25	5 31	- 5 57	5 31	- 1 15	5 32	+ 21 5
	s	"	s	"	s	"	s	"
Jan. 0.5	11.10	65.5	18.34	47.9	55.85	12.9	35.88	38.1
10.4	11.14 ⁴	64.8 ⁷	18.37 ³	49.4 ¹⁵	55.88 ³	14.2 ¹³	35.92 ⁴	38.1 ⁰
20.4	11.13 ⁶	64.2 ⁶	18.35 ²	50.8 ¹⁴	55.86 ²	15.4 ¹²	35.92 ⁰	38.1 ⁰
30.4	11.07 ⁶	63.6 ⁶	18.28 ⁷	52.0 ¹²	55.80 ⁶	16.4 ¹⁰	35.87 ⁵	38.1 ⁰
Feb. 9.3	10.98 ⁹	63.2 ⁴	18.18 ¹⁰	53.0 ¹⁰	55.71 ⁹	17.2 ⁸	35.77 ¹⁰	38.1 ⁰
	12 ⁴	4 ⁴	13 ³	8 ⁸	13 ³	6 ⁶	13 ³	1 ¹
19.3	10.86	62.8	18.05	53.8	55.58	17.8	35.64	38.0
Mar. 1.3	10.71 ¹⁵	62.5 ³	17.89 ¹⁶	54.3 ⁵	55.43 ¹⁵	18.3 ⁵	35.49 ¹⁵	38.0 ⁰
11.3	10.55 ¹⁶	62.4 ¹	17.72 ¹⁷	54.6 ³	55.26 ¹⁷	18.6 ³	35.32 ¹⁷	37.9 ¹
21.2	10.38 ¹⁷	62.3 ¹	17.55 ¹⁷	54.7 ¹	55.09 ¹⁷	18.6 ⁰	35.14 ¹⁸	37.8 ¹
31.2	10.21 ¹⁷	62.2 ¹	17.38 ¹⁷	54.5 ²	54.93 ¹⁶	18.5 ¹	34.97 ¹⁷	37.6 ²
	14 ¹	1 ¹	15 ¹⁵	4 ⁴	15 ¹⁵	3 ³	15 ¹⁵	2 ²
Apr. 10.2	10.07	62.3	17.23	54.1	54.78	18.2	34.82	37.4
20.2	9.95 ¹²	62.5 ²	17.10 ¹³	53.5 ⁶	54.65 ¹³	17.7 ⁵	34.70 ¹²	37.2 ²
30.1	9.86 ⁹	62.7 ²	17.01 ⁹	52.6 ⁹	54.56 ⁹	17.0 ⁷	34.61 ⁹	37.0 ²
May 10.1	9.81 ⁵	63.1 ⁴	16.95 ⁶	51.5 ¹¹	54.50 ⁶	16.2 ⁸	34.55 ⁶	36.9 ¹
20.1	9.80 ¹	63.6 ⁵	16.93 ²	50.3 ¹²	54.49 ¹	15.2 ¹⁰	34.55 ⁰	36.8 ¹
	4 ⁴	6 ⁶	2 ²	14 ¹⁴	2 ²	12 ¹²	4 ⁴	1 ¹
30.0	9.84	64.2	16.95	48.9	54.51	14.0	34.59	36.7
June 9.0	9.92 ⁸	64.9 ⁷	17.01 ⁶	47.3 ¹⁶	54.58 ⁷	12.7 ¹³	34.67 ⁸	36.7 ⁰
19.0	10.04 ¹²	65.7 ⁸	17.12 ¹¹	45.7 ¹⁶	54.69 ¹¹	11.3 ¹⁴	34.80 ¹³	36.9 ²
29.0	10.20 ¹⁶	66.6 ⁹	17.26 ¹⁴	44.0 ¹⁷	54.84 ¹⁵	9.8 ¹⁵	34.97 ¹⁷	37.1 ²
July 8.9	10.39 ¹⁹	67.5 ⁹	17.44 ¹⁸	42.3 ¹⁷	55.02 ¹⁸	8.4 ¹⁴	35.18 ²¹	37.3 ²
	22 ¹⁰	10 ¹⁰	21 ¹⁷	17 ¹⁷	21 ²¹	15 ¹⁵	24 ²⁴	3 ³
18.9	10.61	68.5	17.65	40.6	55.23	6.9	35.42	37.6
28.9	10.86 ²⁵	69.4 ⁹	17.89 ²⁴	39.0 ¹⁶	55.47 ²⁴	5.5 ¹⁴	35.68 ²⁶	38.0 ⁴
Aug. 7.9	11.13 ²⁷	70.3 ⁹	18.14 ²⁵	37.5 ¹⁵	55.73 ²⁶	4.2 ¹³	35.97 ²⁹	38.4 ⁴
17.8	11.42 ²⁹	71.1 ⁸	18.42 ²⁸	36.3 ¹²	56.00 ²⁷	3.1 ¹¹	36.27 ³⁰	38.8 ⁴
27.8	11.71 ²⁹	71.8 ⁷	18.70 ²⁸	35.3 ¹⁰	56.29 ²⁹	2.2 ⁹	36.58 ³¹	39.2 ⁴
	30 ⁵	5 ⁵	29 ²⁹	7 ⁷	29 ²⁹	6 ⁶	32 ³²	3 ³
Sept. 6.8	12.01	72.3	18.99	34.6	56.58	1.6	36.90	39.5
16.7	12.32 ³¹	72.6 ³	19.29 ³⁰	34.3 ³	56.88 ³⁰	1.2 ⁴	37.22 ³²	39.8 ³
26.7	12.62 ³⁰	72.7 ¹	19.58 ²⁹	34.3 ⁰	57.17 ²⁹	1.2 ⁰	37.55 ³³	39.9 ¹
Oct. 6.7	12.92 ³⁰	72.6 ¹	19.87 ²⁹	34.6 ³	57.46 ²⁹	1.5 ³	37.87 ³²	40.0 ¹
16.7	13.21 ²⁷	72.3 ³	20.15 ²⁷	35.3 ¹⁰	57.74 ²⁷	2.1 ⁶	38.17 ³⁰	40.0 ⁰
	27 ⁵	5 ⁵	27 ²⁷	7 ⁷	27 ²⁷	8 ⁸	30 ³⁰	1 ¹
26.6	13.48	71.8	20.42	36.3	58.01	2.9	38.47	39.9
Nov. 5.6	13.75 ²⁷	71.1 ⁷	20.67 ²⁵	37.6 ¹³	58.27 ²⁶	4.0 ¹¹	38.76 ²⁹	39.7 ²
15.6	13.99 ²⁴	70.4 ⁷	20.89 ²²	39.1 ¹⁵	58.50 ²³	5.3 ¹³	39.02 ²⁶	39.5 ²
25.6	14.20 ²¹	69.5 ⁹	21.10 ²¹	40.8 ¹⁷	58.71 ²¹	6.7 ¹⁴	39.25 ²³	39.3 ²
Dec. 5.5	14.38 ¹⁸	68.6 ⁹	21.27 ¹⁷	42.5 ¹⁷	58.88 ¹⁷	8.2 ¹⁵	39.45 ²⁰	39.1 ²
	15 ⁹	9 ⁹	13 ¹³	18 ¹⁸	14 ¹⁴	16 ¹⁶	16 ¹⁶	2 ²
15.5	14.53	67.7	21.40	44.3	59.02	9.8	39.61	38.9
25.5	14.64 ¹¹	66.9 ⁸	21.49 ⁹	46.1 ¹⁸	59.12 ¹⁰	11.3 ¹⁵	39.73 ¹²	38.8 ¹
35.4	14.70 ⁶	66.1 ⁸	21.54 ⁵	47.7 ¹⁶	59.17 ⁵	12.7 ¹⁴	39.80 ⁷	38.7 ¹
Sec δ, Tan δ	1.014	+0.166	1.005	-0.104	1.000	-0.022	1.072	+0.386
Mean Place	9 ^h .193	58 ^m .17	16 ^h .491	53 ^m .66	53 ^h .988	19 ^m .10	33 ^h .850	29 ^m .69
D ^h α, D ^m α	0.00	0.00	0.00	0.00	0.00	0.00	+0.01	0.00
D ^h δ, D ^m δ	0.0	+1.0	0.0	+1.0	0.0	+1.0	0.0	+1.0

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	ζ Orionis. Mag. 2.0		α Columbae. Mag. 2.8		ο Aurigae. Mag. 5.5		ζ Leporis. Mag. 3.7	
	Right Ascension.	Declination S.	Right Ascension.	Declination S.	Right Ascension.	Declination N.	Right Ascension.	Declination S.
	h m 5 36	° ' " — 1 58	h m 5 36	° ' " — 34 6	h m 5 39	° ' " + 49 47	h m 5 43	° ' " — 14 50
Jan. 0.5	30.04	66.4	36.28	64.4	21.65	35.4	8.08	65.2
10.4	30.07 ³	67.8 ¹⁴	36.26 ²	67.2 ²⁸	21.70 ⁵	37.0 ¹⁶	8.10 ²	67.3 ²¹
20.4	30.06 ¹	69.0 ¹²	36.19 ⁷	69.7 ²⁵	21.68 ²	38.5 ¹⁵	8.08 ²	69.1 ¹⁸
30.4	30.00 ⁶	70.1 ¹¹	36.08 ¹¹	71.8 ²¹	21.60 ⁸	39.9 ¹⁴	8.02 ⁶	70.7 ¹⁶
Feb. 9.3	29.91 ⁹	71.0 ⁹	35.92 ¹⁶	73.6 ¹⁸	21.46 ¹⁴	41.0 ¹¹	7.91 ¹¹	72.0 ¹³
	¹³	⁶	¹⁹	¹⁴	²⁰	⁹	¹⁴	¹¹
19.3	29.78	71.6	35.73	75.0	21.26	41.9	7.77	73.1
Mar. 1.3	29.63 ¹⁵	72.1 ⁵	35.51 ²²	75.9 ⁹	21.02 ²⁴	42.5 ⁶	7.61 ¹⁶	73.8 ⁷
11.3	29.46 ¹⁷	72.4 ³	35.28 ²³	76.4 ⁵	20.76 ²⁶	42.7 ²	7.43 ¹⁸	74.2 ⁴
21.2	29.29 ¹⁷	72.5 ¹	35.04 ²⁴	76.4 ⁰	20.50 ²⁶	42.6 ¹	7.24 ¹⁹	74.3 ¹
31.2	29.13 ¹⁶	72.4 ¹	34.81 ²³	75.9 ⁵	20.24 ²⁶	42.2 ⁴	7.06 ¹⁸	74.1 ²
	¹⁵	⁴	²²	⁸	²³	⁸	¹⁷	⁵
Apr. 10.2	28.98	72.0	34.59	75.1	20.01	41.4	6.89	73.6
20.2	28.85 ¹³	71.5 ⁵	34.40 ¹⁹	73.8 ¹³	19.81 ²⁰	40.4 ¹⁰	6.75 ¹⁴	72.8 ⁸
30.1	28.75 ¹⁰	70.9 ⁶	34.24 ¹⁶	72.1 ¹⁷	19.66 ¹⁵	39.2 ¹²	6.63 ¹²	71.7 ¹¹
May 10.1	28.69 ⁶	70.0 ⁹	34.13 ¹¹	70.2 ¹⁹	19.56 ¹⁰	37.8 ¹⁴	6.55 ⁸	70.3 ¹⁴
20.1	28.67 ²	68.9 ¹¹	34.06 ⁷	67.9 ²³	19.53 ³	36.3 ¹⁵	6.51 ⁴	68.7 ¹⁶
	³	¹²	³	²⁶	³	¹⁶	¹	¹⁷
30.0	28.70	67.7	34.03	65.3	19.56	34.7	6.52	67.0
June 9.0	28.76 ⁶	66.4 ¹³	34.05 ²	62.6 ²⁷	19.65 ⁹	33.1 ¹⁶	6.56 ⁴	65.0 ²⁰
19.0	28.86 ¹⁰	65.0 ¹⁴	34.12 ⁷	59.8 ²⁸	19.81 ¹⁶	31.6 ¹⁵	6.65 ⁹	63.0 ²⁰
29.0	29.01 ¹⁵	63.5 ¹⁵	34.24 ¹²	56.9 ²⁹	20.02 ²¹	30.1 ¹⁵	6.77 ¹²	60.9 ²¹
July 8.9	29.18 ¹⁷	62.0 ¹⁵	34.40 ¹⁶	54.1 ²⁸	20.29 ²⁷	28.8 ¹³	6.94 ¹⁷	58.8 ²¹
	²¹	¹⁵	²⁰	²⁸	³²	¹²	¹⁹	²¹
18.9	29.39	60.5	34.60	51.3	20.61	27.6	7.13	56.7
28.9	29.63 ²⁴	59.1 ¹⁴	34.83 ²³	48.8 ²⁵	20.97 ³⁶	26.6 ¹⁰	7.35 ²²	54.8 ¹⁹
Aug. 7.9	29.88 ²⁵	57.8 ¹³	35.09 ²⁶	46.6 ²²	21.35 ³⁸	25.8 ⁸	7.60 ²⁵	53.0 ¹⁸
17.8	30.15 ²⁷	56.7 ¹¹	35.38 ²⁹	44.7 ¹⁹	21.77 ⁴²	25.1 ⁷	7.87 ²⁷	51.5 ¹⁵
27.8	30.43 ²⁸	55.8 ⁹	35.68 ³⁰	43.2 ¹⁵	22.20 ⁴³	24.7 ⁴	8.15 ²⁸	50.4 ¹¹
	²⁹	⁶	³²	⁹	⁴⁵	²	²⁹	⁸
Sept. 6.8	30.72	55.2	36.00	42.3	22.65	24.5	8.44	49.6
16.7	31.02 ³⁰	54.8 ⁴	36.33 ³³	41.8 ⁵	23.11 ⁴⁶	24.5 ⁰	8.73 ²⁹	49.2 ⁴
26.7	31.32 ³⁰	54.8 ⁰	36.65 ³²	41.9 ¹	23.57 ⁴⁶	24.7 ²	9.03 ³⁰	49.2 ⁰
Oct. 6.7	31.61 ²⁹	55.1 ³	36.97 ³²	42.6 ⁷	24.02 ⁴⁵	25.0 ³	9.32 ²⁹	49.6 ⁴
16.7	31.89 ²⁷	55.7 ⁶	37.28 ³¹	43.8 ¹²	24.46 ⁴⁴	25.6 ⁶	9.61 ²⁹	50.5 ⁹
	²⁷	⁹	²⁹	¹⁸	⁴²	⁸	²⁷	¹³
26.6	32.16	56.6	37.57	45.6	24.88	26.4	9.88	51.8
Nov. 5.6	32.42 ²⁶	57.7 ¹¹	37.84 ²⁷	47.8 ²²	25.28 ⁴⁰	27.4 ¹⁰	10.14 ²⁶	53.4 ¹⁶
15.6	32.65 ²³	59.0 ¹³	38.08 ²⁴	50.3 ²⁵	25.65 ³⁷	28.5 ¹¹	10.38 ²⁴	55.3 ¹⁹
25.6	32.86 ²¹	60.5 ¹⁵	38.28 ²⁰	53.2 ²⁹	25.98 ³³	29.8 ²¹	10.59 ²¹	57.4 ²¹
Dec. 5.5	33.04 ¹⁸	62.1 ¹⁶	38.44 ¹⁶	56.2 ³⁰	26.26 ²⁸	31.2 ¹⁴	10.76 ¹⁷	59.6 ²²
	¹⁴	¹⁶	¹¹	³¹	²²	¹⁶	¹⁴	²³
15.5	33.18	63.7	38.55	59.3	26.48	32.8	10.90	61.9
25.5	33.29 ¹¹	65.2 ¹⁵	38.62 ⁷	62.3 ³⁰	26.64 ¹⁶	34.4 ¹⁶	11.00 ¹⁰	64.2 ²³
35.4	33.34 ⁵	66.7 ¹⁵	38.63 ¹	65.2 ²⁹	26.74 ¹⁰	36.0 ¹⁶	11.05 ⁵	66.4 ²²
Sec δ, Tan δ	1.001	—0.035	1.208	—0.677	1.549	+1.183	1.035	—0.205
Mean Place	28°.173	72''.54	34°.264	68''.00	18°.817	24''.84	6°.208	70''.26
D'ψ a, Dω a	0.00	0.00	—0.02	0.00	+0.03	—0.01	—0.01	0.00
Dψ δ, Dω δ	0.0	+1.0	0.0	+1.0	0.0	+1.0	0.0	+1.0

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	κ Orionis. Mag. 2.2		δ Doradus. Mag. 4.5		ν Aurigæ. Mag. 4.2		δ Leporis. Mag. 3.9	
	Right Ascension.	Declination S.	Right Ascension.	Declination S.	Right Ascension.	Declination N.	Right Ascension.	Declination S.
	h m	° '	h m	° '	h m	° '	h m	° '
	5 43	— 9 41	5 44	— 65 45	5 45	+39 7	5 47	— 20 52
	s	"	s	"	s	"	s	"
Jan. 0.5	45.36	51.0	40.44	59.8	38.32	38.4	41.82	63.2
10.4	45.39 3	52.9 19	40.26 18	63.2 34	38.38 6	39.4 10	41.84 2	65.6 24
20.4	45.38 1	54.5 16	39.98 28	66.2 30	38.39 1	40.4 10	41.82 8	67.7 21
30.4	45.32 6	55.9 14	39.62 36	68.8 26	38.33 6	41.3 9	41.74 11	69.6 19
Feb. 9.4	45.22 13	57.0 10	39.19 43	71.0 22	38.23 15	42.1 6	41.63 15	71.2 12
19.3	45.09 16	58.0 6	38.69 54	72.7 12	38.08 19	42.7 4	41.48 17	72.4 9
Mar. 1.3	44.93 17	58.6 4	38.15 56	73.9 6	37.89 21	43.1 2	41.31 19	73.3 5
11.3	44.76 18	59.0 1	37.59 58	74.5 0	37.68 21	43.3 1	41.12 20	73.8 1
21.2	44.58 17	59.1 2	37.01 56	74.5 5	37.47 21	43.2 2	40.92 19	73.9 2
31.2	44.41 16	58.9 4	36.45 54	74.0 10	37.26 19	43.0 5	40.73 18	73.7 6
Apr. 10.2	44.25 14	58.5 7	35.91 49	73.0 15	37.07 16	42.5 7	40.55 16	73.1 9
20.2	44.11 11	57.8 9	35.42 45	71.5 19	36.91 13	41.8 8	40.39 13	72.2 12
30.1	44.00 7	56.9 12	34.97 37	69.6 24	36.78 8	41.0 10	40.26 9	71.0 15
May 10.1	43.93 3	55.7 13	34.60 30	67.2 27	36.70 3	40.0 10	40.17 5	69.5 17
20.1	43.90 1	54.4 16	34.30 22	64.5 30	36.68 3	39.0 10	40.12 1	67.8 20
30.1	43.91 5	52.8 17	34.08 12	61.5 32	36.71 8	38.0 10	40.11 3	65.8 22
June 9.0	43.96 9	51.1 18	33.96 4	58.3 33	36.79 13	37.0 10	40.14 8	63.6 23
19.0	44.05 13	49.3 19	33.92 6	55.0 34	36.92 18	36.0 10	40.22 12	61.3 23
29.0	44.18 16	47.5 18	33.98 15	51.6 33	37.10 23	35.1 9	40.34 15	59.0 24
July 8.9	44.34 20	45.6 19	34.13 23	48.3 32	37.33 27	34.3 7	40.49 19	56.6 23
18.9	44.54 22	43.7 17	34.36 31	45.1 30	37.60 30	33.6 6	40.68 22	54.3 21
28.9	44.76 25	42.0 16	34.67 39	42.1 26	37.90 33	33.0 4	40.90 24	52.2 19
Aug. 7.9	45.01 26	40.4 13	35.06 45	39.5 22	38.23 35	32.6 4	41.14 27	50.3 16
17.8	45.27 28	39.1 10	35.51 50	37.3 17	38.58 37	32.2 2	41.41 28	48.7 13
27.8	45.55 29	38.1 8	36.01 54	35.6 12	38.95 37	32.0 1	41.69 29	47.4 9
Sept. 6.8	45.84 29	37.3 4	36.55 56	34.4 5	39.32 39	31.9 0	41.98 30	46.5 4
16.8	46.13 30	36.9 0	37.11 56	33.9 1	39.71 38	31.9 1	42.28 31	46.1 0
26.7	46.43 29	36.9 4	37.67 56	34.0 8	40.09 39	32.0 1	42.59 30	46.1 5
Oct. 6.7	46.72 29	37.3 8	38.23 53	34.8 15	40.48 36	32.1 3	42.89 28	46.6 10
16.7	47.01 27	38.1 11	38.76 49	36.3 20	40.86 36	32.4 4	43.18 28	47.6 15
26.6	47.28 26	39.2 15	39.25 44	38.3 26	41.22 34	32.8 5	43.46 26	49.1 18
Nov. 5.6	47.54 24	40.7 16	39.69 36	40.9 30	41.56 32	33.3 6	43.72 24	50.9 21
15.6	47.78 21	42.3 19	40.05 28	43.9 33	41.88 29	33.9 7	43.96 17	53.0 24
25.6	47.99 18	44.2 20	40.33 19	47.2 36	42.17 25	34.6 8	44.17 18	55.4 25
Dec. 5.5	48.17 14	46.2 20	40.52 9	50.8 37	42.42 21	35.4 9	44.35 14	57.9 26
15.5	48.31 10	48.2 20	40.61 2	54.5 36	42.63 15	36.3 9	44.49 10	60.5 26
25.5	48.41 6	50.2 19	40.59 11	58.1 35	42.78 10	37.2 9	44.59 5	63.1 26
35.5	48.47	52.1 19	40.48	61.6 35	42.88 10	38.2 10	44.64	65.6 25
Sec δ , Tan δ	1.015	—0.171	2.436	—2.221	1.289	+0.813	1.070	—0.382
Mean Place	43°.496	56''.49	37°.108	62''.69	35°.884	29''.15	39°.924	67''.97
$D\mu a$, $D\mu \alpha$	0.00	0.00	—0.06	+0.01	+0.02	0.00	—0.01	0.00
$D\mu \delta$, $D\mu \delta$	0.0	+1.0	0.0	+1.0	0.0	+1.0	0.0	+1.0

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	α Orionis. (Betelgeux.) Var. 1.0-1.4.		δ Aurigæ. Mag. 3.9		η Leporis. Mag. 3.8		β Aurigæ. Mag. 2.1	
	Right Ascension.	Declination N.	Right Ascension.	Declination N.	Right Ascension.	Declination S.	Right Ascension.	Declination N.
	h m 5 50	° ' + 7 23	h m 5 52	° ' + 54 16	h m 5 52	° ' - 14 10	h m 5 53	° ' + 44 56
	s 5	" 9	s 5	" 7	s 5	" 10	s 5	" 13
Jan. 0.5	36.12	38.3	34.91	56.4	33.87	51.7	20.33	33.2
10.4	36.17 5	37.4 9	34.98 7	58.2 18	33.91 4	53.7 20	20.40 7	34.5 13
20.4	36.18 1	36.6 8	34.97 1	60.0 18	33.89 2	55.6 19	20.41 1	35.8 13
30.4	36.14 4	36.0 6	34.89 8	61.6 16	33.84 5	57.2 16	20.35 6	37.0 12
Feb. 9.4	36.06 8	35.4 6	34.74 15	63.0 14	33.74 10	58.6 14	20.24 11	38.1 11
	12	4	21	11	13	10	17	8
Mar. 19.3	35.94	35.0	34.53	64.1	33.61	59.6	20.07	38.9
1.3	35.80 14	34.7 3	34.28 25	64.9 8	33.45 16	60.4 8	19.87 20	39.5 6
11.3	35.64 16	34.5 2	33.99 29	65.3 4	33.27 18	60.9 5	19.65 22	39.8 3
21.3	35.47 17	34.4 1	33.69 30	65.4 3	33.08 19	61.0 1	19.41 24	39.9 1
31.2	35.30 17	34.4 0	33.40 29	65.1 1	32.90 18	60.8 2	19.17 24	39.6 3
	15	1	27	7	17	4	22	5
Apr. 10.2	35.15	34.5	33.13	64.4	32.73	60.4	18.95	39.1
20.2	35.02 13	34.7 2	32.89 24	63.4 10	32.58 15	59.6 8	18.77 18	38.3 8
30.1	34.92 10	35.0 3	32.71 18	62.1 13	32.46 12	58.6 10	18.62 15	37.3 10
May 10.1	34.86 6	35.5 5	32.58 13	60.6 15	32.38 8	57.3 13	18.52 10	36.2 11
20.1	34.83 3	36.0 5	32.51 7	58.9 17	32.33 5	55.8 15	18.48 4	34.9 11
	2	7	1	18	0	17	2	11
June 30.1	34.85	36.7	32.52	57.1	32.33	54.1	18.50	33.6
9.0	34.91 6	37.5 8	32.60 8	55.3 18	32.37 4	52.3 18	18.57 7	32.2 11
19.0	35.01 10	38.3 8	32.74 14	53.5 18	32.44 7	50.3 20	18.70 13	30.9 11
29.0	35.15 14	39.3 10	32.95 21	51.7 18	32.56 12	48.2 21	18.89 19	29.6 11
July 8.9	35.32 17	40.3 10	33.22 27	50.1 16	32.72 16	46.1 21	19.12 23	28.5 11
	20	9	33	15	18	20	28	11
18.9	35.52	41.2	33.55	48.6	32.90	44.1	19.40	27.4
28.9	35.76 24	42.2 10	33.92 37	47.2 14	33.12 22	42.2 19	19.72 32	26.5 11
Aug. 7.9	36.01 25	43.1 9	34.33 41	46.1 11	33.36 24	40.5 17	20.07 35	25.8 11
17.8	36.28 27	43.8 7	34.77 44	45.2 9	33.62 26	39.0 15	20.44 37	25.1 11
27.8	36.57 29	44.4 6	35.24 47	44.5 7	33.90 28	37.8 12	20.83 39	24.7 11
	29	5	49	5	28	8	41	11
Sept. 6.8	36.86	44.9	35.73	44.0	34.18	37.0	21.24	24.4
16.8	37.16 30	45.1 2	36.22 49	43.8 2	34.47 29	36.6 4	21.66 42	24.2 11
26.7	37.46 30	45.1 0	36.72 50	43.8 0	34.77 30	36.6 0	22.08 42	24.2 11
Oct. 6.7	37.76 30	44.9 2	37.22 50	44.0 2	35.07 30	37.0 4	22.50 42	24.4 11
16.7	38.06 30	44.5 4	37.71 49	44.5 5	35.36 29	37.9 9	22.91 41	24.7 11
	29	6	48	7	28	12	40	11
26.6	38.35	43.9	38.19	45.2	35.64	39.1	23.31	25.1
Nov. 5.6	38.62 27	43.1 8	38.64 45	46.2 10	35.90 26	40.7 16	23.69 38	25.7 11
15.6	38.87 25	42.1 10	39.06 42	47.3 11	36.14 24	42.6 19	24.05 36	26.5 11
25.6	39.10 23	41.1 10	39.43 37	48.7 14	36.36 22	44.7 21	24.37 32	27.5 11
Dec. 5.5	39.30 20	40.0 11	39.75 32	50.3 16	36.54 18	46.9 22	24.64 27	28.6 11
	17	11	26	17	15	23	23	11
15.5	39.47	38.9	40.01	52.0	36.69	49.2	24.87	29.7
25.5	39.59 12	37.9 10	40.20 19	53.8 18	36.80 11	51.4 22	25.04 17	31.0 11
35.5	39.67 8	36.9 10	40.32 12	55.7 19	36.86 6	53.6 22	25.15 11	32.3 11
Sec δ , Tan δ	1.008	+0.130	1.712	+1.391	1.031	-0.253	1.413	+0.998
Mean Place	34°.187	31''.66	34°.753	46''.62	31°.996	56''.85	17°.660	24''.07
$D'\psi\alpha$, $D\omega\alpha$	0.00	0.00	+0.04	0.00	-0.01	0.00	+0.03	0.00
$D\psi\delta$, $D\omega\delta$	0.0	+1.0	0.0	+1.0	0.0	+1.0	0.0	+1.0

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	θ Aurigæ. Mag. 2.7		1 Geminorum. Mag. 4.3		1 Puppis (G.). Mag. 6.2		γ Orionis. Mag. 4.4	
	Right Ascension.	Declination N.	Right Ascension.	Declination N.	Right Ascension.	Declination S.	Right Ascension.	Declination N.
	h m 5 53	° ' +37 12	h m 5 58	° ' +23 16	h m 6 2	° ' -45 1	h m 6 2	° ' +14 46
	s "	"	s "	"	s "	"	s "	"
Jan. 0.5	57.91	36.3	59.33	15.2	3.85	65.7	45.18	53.0
10.4	57.98	37.2	59.40	15.3	3.83	68.9	45.24	52.6
20.4	57.99	38.0	59.42	15.4	3.75	71.9	45.26	52.2
30.4	57.95	38.9	59.39	15.5	3.61	74.5	45.24	51.9
Feb. 9.4	57.86	39.6	59.32	15.7	3.43	76.7	45.17	51.6
19.3	57.72	40.2	59.20	15.8	3.20	78.5	45.06	51.5
Mar. 1.3	57.54	40.6	59.05	15.9	2.93	79.8	44.92	51.3
11.3	57.34	40.8	58.88	15.9	2.65	80.6	44.76	51.3
21.3	57.13	40.8	58.71	15.9	2.35	80.9	44.59	51.2
31.2	56.93	40.6	58.53	15.8	2.06	80.7	44.42	51.2
Apr. 10.2	56.74	40.2	58.37	15.7	1.78	80.0	44.26	51.2
20.2	56.58	39.6	58.23	15.5	1.52	78.9	44.13	51.2
30.1	56.45	38.9	58.12	15.2	1.29	77.3	44.02	51.3
May 10.1	56.37	38.1	58.04	15.0	1.10	75.3	43.95	51.4
20.1	56.34	37.2	58.01	14.8	0.97	73.0	43.92	51.6
30.1	56.36	36.2	58.03	14.6	0.89	70.3	43.93	51.9
June 9.0	56.43	35.3	58.09	14.5	0.85	67.5	43.98	52.2
19.0	56.55	34.4	58.20	14.4	0.87	64.4	44.07	52.6
29.0	56.72	33.6	58.34	14.3	0.95	61.3	44.21	53.1
July 9.0	56.94	32.9	58.53	14.4	1.07	58.2	44.38	53.6
18.9	57.19	32.2	58.75	14.4	1.25	55.2	44.58	54.1
28.9	57.47	31.7	59.00	14.6	1.46	52.3	44.81	54.6
Aug. 7.9	57.79	31.2	59.27	14.7	1.72	49.8	45.07	55.1
17.8	58.13	30.9	59.56	14.8	2.02	47.6	45.34	55.5
27.8	58.48	30.6	59.87	14.9	2.34	45.8	45.63	55.9
Sept. 6.8	58.85	30.4	60.18	15.0	2.68	44.6	45.93	56.1
16.8	59.22	30.4	60.51	15.0	3.03	43.9	46.24	56.2
26.7	59.60	30.3	60.84	15.0	3.40	43.9	46.55	56.2
Oct. 6.7	59.98	30.4	61.17	14.9	3.76	44.4	46.86	56.0
16.7	60.35	30.6	61.49	14.7	4.12	45.6	47.17	55.6
26.7	60.71	30.8	61.81	14.5	4.46	47.3	47.47	55.1
Nov. 5.6	61.05	31.1	62.11	14.2	4.77	49.6	47.76	54.5
15.6	61.37	31.6	62.40	14.0	5.05	52.3	48.03	53.9
25.6	61.66	32.1	62.66	13.7	5.29	55.3	48.28	53.2
Dec. 5.5	61.92	32.7	62.89	13.5	5.49	58.6	48.50	52.5
15.5	62.13	33.5	63.08	13.4	5.63	62.1	48.69	51.8
25.5	62.29	34.3	63.23	13.3	5.71	65.5	48.83	51.2
35.5	62.39	35.1	63.33	13.3	5.73	68.9	48.93	50.6
Sec δ , Tan δ	1.256	+0.759	1.089	+0.430	1.415	-1.001	1.034	+0.264
Mean Place	55°.502	27°.69	57°.210	7°.88	1°.631	69°.90	43°.158	46°.33
$D^{\circ}\alpha$, $D_{\alpha}\alpha$	+0.02	0.00	+0.01	0.00	-0.03	0.00	+0.01	0.00
$D^{\circ}\delta$, $D_{\delta}\delta$	0.0	+1.0	0.0	+1.0	0.0	+1.0	0.0	+1.0

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	22 H. Camelop. Mag. 4.7		77 Geminorum. Var. 3.2-4.2.		2 Lynceis. Mag. 4.4		ζ Canis M Mag. 3.	
	Right Ascension.	Declination N.	Right Ascension.	Declination N.	Right Ascension.	Declination N.	Right Ascension.	
	h m 6 9	° ' " +69 20	h m 6 9	° ' " +22 31	h m 6 12	° ' " +59 2	h m 6 17	
	s	"	s	"	s	"	s	
Jan. 0.5	34.07	74.3	46.98	63.4	11.24	43.8	4.89	
10.5	34.18 ¹¹	76.8 ²⁵	47.06 ⁸	63.4 ⁰	11.34 ¹⁰	45.9 ²¹	4.92 ³	
20.4	34.15 ³	79.3 ²⁵	47.09 ³	63.5 ¹	11.36 ²	48.0 ²¹	4.91 ¹	
30.4	34.00 ¹⁵	81.6 ²³	47.07 ²	63.6 ¹	11.29 ⁷	50.0 ²⁰	4.84 ⁷	
Feb. 9.4	33.73 ²⁷	83.7 ²¹	47.00 ⁷	63.7 ¹	11.13 ¹⁶	51.6 ¹⁶	4.72 ¹²	
	36	17	11	1	22	14	15	
19.3	33.37	85.4	46.89	63.8	10.91	53.0	4.57	
Mar. 1.3	32.93 ⁴⁴	86.6 ¹²	46.75 ¹⁴	63.9 ¹	10.63 ²⁸	54.1 ¹¹	4.39 ¹⁸	
11.3	32.44 ⁴⁹	87.4 ⁸	46.59 ¹⁶	64.0 ¹	10.31 ³²	54.8 ⁷	4.18 ²¹	
21.3	31.92 ⁵²	87.7 ³	46.42 ¹⁷	64.0 ⁰	9.96 ³⁵	55.1 ³	3.96 ²²	
31.2	31.39 ⁵³	87.5 ²	46.24 ¹⁸	64.0 ⁰	9.62 ³⁴	55.0 ¹	3.73 ²³	
	50	7	17	1	33	6	21	
Apr. 10.2	30.89	86.8	46.07	63.9	9.29	54.4	3.52	
20.2	30.44 ⁴⁵	85.7 ¹¹	45.93 ¹⁴	63.8 ¹	9.00 ²⁹	53.5 ⁹	3.33 ¹⁹	
30.2	30.07 ³⁷	84.2 ¹⁵	45.81 ¹²	63.6 ²	8.76 ²⁴	52.2 ¹³	3.16 ¹⁷	
May 10.1	29.78 ²⁹	82.3 ¹⁹	45.74 ⁷	63.4 ²	8.58 ¹⁸	50.7 ¹⁵	3.03 ¹³	
20.1	29.58 ²⁰	80.1 ²²	45.70 ⁴	63.3 ¹	8.47 ¹¹	48.9 ¹⁸	2.93 ¹⁰	
	8	23	0	2	4	19	5	
30.1	29.50	77.8	45.70	63.1	8.43	47.0	2.88	
June 9.0	29.53 ³	75.3 ²⁵	45.75 ⁵	63.0 ¹	8.47 ⁴	44.9 ²¹	2.87 ¹	
19.0	29.66 ¹³	72.7 ²⁶	45.84 ⁹	62.9 ¹	8.59 ¹²	42.9 ²⁰	2.90 ³	
29.0	29.91 ²⁵	70.2 ²⁵	45.98 ¹⁴	62.9 ⁰	8.79 ²⁰	40.8 ²¹	2.98 ⁸	
July 9.0	30.26 ³⁵	67.8 ²⁴	46.15 ¹⁷	62.9 ⁰	9.05 ²⁶	38.8 ²⁰	3.10 ¹²	
	44	23	21	1	33	18	16	
18.9	30.70	65.5	46.36	63.0	9.38	37.0	3.26	
28.9	31.23 ⁵³	63.4 ²¹	46.60 ²⁴	63.1 ¹	9.76 ³⁸	35.3 ¹⁷	3.45 ¹⁹	
Aug. 7.9	31.83 ⁶⁰	61.6 ¹⁸	46.86 ²⁶	63.2 ¹	10.19 ⁴³	33.7 ¹⁶	3.68 ²³	
17.9	32.49 ⁶⁶	60.0 ¹⁶	47.14 ²⁸	63.3 ¹	10.66 ⁴⁷	32.4 ¹³	3.93 ²⁵	
27.8	33.20 ⁷¹	58.7 ¹³	47.44 ³⁰	63.3 ⁰	11.17 ⁵¹	31.3 ¹¹	4.21 ²⁸	
	75	10	31	0	53	8	29	
Sept. 6.8	33.95	57.7	47.75	63.3	11.70	30.5	4.50	
16.8	34.73 ⁸⁰	57.1 ⁶	48.07 ³²	63.3 ⁰	12.25 ⁵⁵	30.0 ⁵	4.81 ³¹	
26.7	35.53 ⁸⁰	56.8 ³	48.40 ³³	63.2 ¹	12.81 ⁵⁶	29.7 ³	5.12 ³¹	
Oct. 6.7	36.33 ⁸⁰	56.9 ¹	48.73 ³³	63.0 ²	13.37 ⁵⁶	29.7 ⁰	5.44 ³²	
16.7	37.12 ⁷⁹	57.3 ⁴	49.06 ³³	62.7 ³	13.93 ⁵⁶	30.0 ³	5.75 ³¹	
	76	9	32	3	55	5	31	
26.7	37.88	58.2	49.38	62.4	14.48	30.5	6.06	
Nov. 5.6	38.61 ⁷³	59.4 ¹²	49.69 ³¹	62.0 ⁴	15.00 ⁵²	31.4 ⁹	6.35 ²⁹	
15.6	39.29 ⁶⁸	60.9 ¹⁵	49.98 ²⁹	61.7 ³	15.49 ⁴⁹	32.6 ¹²	6.62 ²⁷	
25.6	39.89 ⁶⁰	62.8 ¹⁹	50.25 ²⁷	61.4 ³	15.93 ⁴⁴	34.0 ¹⁴	6.86 ²⁴	
Dec. 5.6	40.40 ⁵¹	64.9 ²¹	50.48 ²³	61.1 ³	16.31 ³⁸	35.6 ¹⁶	7.07 ²¹	
	42	23	20	3	32	18	16	
15.5	40.82	67.2	50.68	60.8	16.63	37.4	7.23	
25.5	41.12 ³⁰	69.7 ²⁵	50.84 ¹⁶	60.6 ²	16.88 ²⁵	39.4 ²⁰	7.35 ¹²	
35.5	41.30 ¹⁸	72.2 ²⁵	50.95 ¹¹	60.5 ¹	17.03 ¹⁵	41.5 ²¹	7.42 ⁷	
Sec δ, Tan δ	2.836	+2.654	1.083	+0.415	1.944	+1.667	1.155	
Mean Place	28°.988	65°'.37	44°.853	56°'.66	7°.607	35°'.59	2°.925	3'
D'ψ a, D ₀ a	+0.07	+0.01	+0.01	0.00	+0.05	+0.01	-0.02	
Dψ δ, D ₀ δ	0.0	+1.0	0.0	+1.0	0.0	+1.0	0.0	

FOR THE UPPER TRANSIT AT WASHINGTON.

an Solar Date.	μ Geminorum. Mag. 3.2		ψ^1 Aurigæ. Mag. 5.1		β Canis Majoris. Mag. 2.0		δ Monocerotis. Mag. 4.5	
	Right Ascension.	Declina- tion N.	Right Ascension.	Declina- tion N.	Right Ascension.	Declina- tion S.	Right Ascension.	Declina- tion N.
	h m 6 17	° ' " +22 33	h m 6 18	° ' " +49 19	h m 6 18	° ' " -17 54	h m 6 19	° ' " + 4 38
un. 0.5	51.26	36.0	24.25	64.6	59.26	41.1	17.81	18.7
10.5	51.35 9	36.0 0	24.36 11	66.1 15	59.32 6	43.5 24	17.88 7	17.5 12
20.4	51.39 4	36.0 0	24.39 3	67.7 16	59.33 1	45.6 21	17.91 3	16.5 10
30.4	51.38 1	36.1 1	24.36 3	69.2 15	59.28 5	47.6 20	17.90 1	15.6 9
eb. 9.4	51.32 10	36.3 1	24.26 16	70.6 11	59.20 13	49.2 13	17.84 10	14.9 5
19.3	51.22	36.4	24.10	71.7	59.07	50.5	17.74	14.4
ar. 1.3	51.08 14	36.5 1	23.89 21	72.6 9	58.92 15	51.5 10	17.60 14	14.0 4
11.3	50.92 16	36.6 1	23.65 24	73.2 6	58.74 18	52.2 7	17.45 15	13.7 3
21.3	50.74 18	36.7 1	23.39 26	73.5 3	58.55 19	52.5 3	17.29 16	13.6 1
31.2	50.57 17	36.7 1	23.13 25	73.5 4	58.36 18	52.5 3	17.12 16	13.6 2
pr. 10.2	50.40	36.6	22.88	73.1	58.18	52.2	16.96	13.8
20.2	50.25 15	36.5 1	22.66 22	72.4 7	58.02 16	51.6 6	16.82 14	14.0 2
30.2	50.13 12	36.4 1	22.48 18	71.5 9	57.88 14	50.6 10	16.70 12	14.4 4
ay 10.1	50.05 8	36.2 2	22.34 14	70.3 12	57.77 11	49.3 13	16.62 8	14.9 5
20.1	50.01 4	36.0 2	22.26 8	69.0 13	57.70 7	47.8 15	16.57 5	15.6 7
30.1	50.00 1	35.8	22.24	67.5	57.67	46.1	16.56	16.3
ine 9.0	50.05 5	35.7 1	22.28 4	65.9 16	57.68 1	44.2 19	16.59 3	17.2 9
19.0	50.13 8	35.6 1	22.38 10	64.3 16	57.73 5	42.2 20	16.67 8	18.1 9
29.0	50.26 13	35.6 0	22.54 16	62.7 16	57.82 9	40.0 22	16.78 11	19.1 10
ily 9.0	50.42 16	35.6 0	22.76 22	61.2 15	57.95 13	37.8 21	16.92 14	20.1 10
18.9	50.62 23	35.6 0	23.02 31	59.8 14	58.11 19	35.7 20	17.10 21	21.1 10
28.9	50.85 26	35.6 0	23.33 35	58.4 12	58.30 22	33.7 18	17.31 23	22.1 9
ig. 7.9	51.11 28	35.7 1	23.68 38	57.2 10	58.52 25	31.9 16	17.54 25	23.0 8
17.9	51.39 29	35.7 0	24.06 40	56.2 9	58.77 26	30.3 13	17.79 27	23.8 6
27.8	51.68 31	35.7 0	24.46 43	55.3 7	59.03 28	29.0 10	18.06 28	24.4 4
pt. 6.8	51.99 32	35.7 1	24.89 44	54.6 5	59.31 29	28.0 5	18.34 29	24.8 1
16.8	52.31 33	35.6 2	25.33 45	54.1 3	59.60 30	27.5 1	18.63 30	24.9 0
26.7	52.64 33	35.4 3	25.78 46	53.8 2	59.90 30	27.4 4	18.93 30	24.9 3
ct. 6.7	52.97 33	35.1 3	26.24 45	53.6 1	60.20 30	27.8 9	19.23 30	24.6 6
16.7	53.30 32	34.8 4	26.69 44	53.7 3	60.50 29	28.7 13	19.53 29	24.0 8
26.7	53.62 31	34.4 4	27.13 43	54.0 4	60.79 28	30.0 16	19.82 29	23.2 11
ov. 5.6	53.93 30	34.0 4	27.56 41	54.4 7	61.07 26	31.6 20	20.11 27	22.1 11
15.6	54.23 27	33.6 4	27.97 37	55.1 10	61.33 24	33.6 23	20.38 25	21.0 13
25.6	54.50 25	33.2 4	28.34 33	56.1 11	61.57 17	35.9 24	20.63 22	19.7 14
ec. 5.6	54.75 21	32.8 3	28.67 28	57.2 13	61.78 17	38.3 25	20.85 19	18.3 13
15.5	54.96 17	32.5 2	28.95 21	58.5 14	61.95 13	40.8 25	21.04 15	17.0 13
25.5	55.13 11	32.3 1	29.16 15	59.9 15	62.08 9	43.3 25	21.19 11	15.7 13
35.5	55.24	32.2	29.31	61.4	62.17	45.8	21.30	14.4
δ , Tan δ	1.083	+0.415	1.534	+1.164	1.051	-0.323	1.003	+0.081
an Place	49°.125	29''.65	21°.286	57''.25	57°.372	46''.37	15°.865	12''.90
ϕ , D_{α}	+0.01	0.00	+0.03	+0.01	-0.01	0.00	0.00	0.00
ϕ , D_{δ}	0.0	+1.0	0.0	+1.0	0.0	+1.0	0.0	+1.0

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	α Argus. (Canopus.) Mag. -0.9		10 Monocerotis. Mag. 5.0		γ Geminorum. Mag. 4.1		δ Lynx. Mag. 6.0	
	Right Ascension.	Declina- tion S.	Right Ascension.	Declina- tion S.	Right Ascension.	Declina- tion N.	Right Ascension.	Declina- tion N.
	h m 6 22	° ' " - 52 38	h m 6 23	° ' " - 4 42	h m 6 23	° ' " + 20 16	h m 6 29	° ' " + 61 33
Jan. 0.5	6.32	51.1	47.69	25.9	57.09	7.0	59.59	33.2
10.5	6.30 ²	54.6 ³⁵	47.76 ⁷	27.6 ¹⁷	57.19 ¹⁰	6.8 ²	59.73 ¹⁴	35.4 ²²
20.4	6.21 ⁹	57.8 ³²	47.79 ³	29.1 ¹⁵	57.23 ⁴	6.7 ¹	59.78 ⁵	37.6 ²¹
30.4	6.06 ¹⁵	60.7 ²⁹	47.77 ²	30.5 ¹⁴	57.22 ¹	6.6 ¹	59.72 ⁶	39.7 ²¹
Feb. 9.4	5.85 ²¹	63.3 ²⁶	47.70 ⁷	31.6 ¹¹	57.17 ⁵	6.7 ¹	59.58 ¹⁴	41.6 ¹⁹
19.4	5.58 ²⁷	65.4 ²¹	47.60 ¹⁰	32.5 ⁹	57.07 ¹⁰	6.7 ⁰	59.35 ²³	43.2 ¹⁶
Mar. 1.3	5.27 ³¹	67.1 ¹⁷	47.46 ¹⁴	33.2 ⁷	56.94 ¹³	6.8 ¹	59.06 ²⁹	44.5 ¹³
11.3	4.93 ³⁴	68.2 ¹¹	47.31 ¹⁵	33.7 ⁵	56.78 ¹⁶	6.9 ¹	58.73 ³³	45.5 ¹⁹
21.3	4.57 ³⁶	68.8 ⁶	47.14 ¹⁷	33.9 ²	56.61 ¹⁷	6.9 ⁰	58.36 ³⁷	46.0 ⁵
31.2	4.22 ³⁵	68.9 ¹	46.97 ¹⁷	33.9 ⁰	56.43 ¹⁸	7.0 ¹	57.98 ³⁸	46.0 ⁰
Apr. 10.2	3.87 ³⁵	68.4 ⁵	46.80 ¹⁷	33.7 ²	56.27 ¹⁶	7.0 ⁰	57.62 ³⁶	45.7 ³
20.2	3.54 ³³	67.5 ⁹	46.65 ¹⁵	33.3 ⁴	56.12 ¹⁵	6.9 ¹	57.28 ³⁴	44.9 ⁸
30.2	3.25 ²⁹	66.1 ¹⁴	46.53 ¹²	32.6 ⁷	56.00 ¹²	6.9 ⁰	57.00 ²⁸	43.7 ¹²
May 10.1	3.00 ²⁵	64.3 ¹⁸	46.44 ⁹	31.8 ⁸	55.91 ⁹	6.8 ¹	56.77 ²³	42.2 ¹⁵
20.1	2.79 ²¹	62.0 ²³	46.38 ⁶	30.8 ¹⁰	55.87 ⁴	6.7 ¹	56.62 ¹⁵	40.4 ²⁰
30.1	2.64 ¹⁵	59.4 ²⁶	46.36 ²	29.6 ¹²	55.86 ¹	6.7 ⁰	56.54 ⁸	38.4 ²⁰
June 9.1	2.55 ⁹	56.6 ²⁸	46.38 ⁶	28.3 ¹³	55.89 ³	6.7 ⁰	56.54 ⁰	36.3 ²¹
19.0	2.52 ³	53.5 ³¹	46.44 ¹⁰	26.9 ¹⁴	55.97 ⁸	6.7 ⁰	56.63 ⁹	34.1 ²²
29.0	2.56 ⁴	50.3 ³²	46.54 ¹⁰	25.5 ¹⁴	56.09 ¹²	6.8 ¹	56.80 ¹⁷	31.9 ²²
July 9.0	2.65 ⁹	47.1 ³²	46.67 ¹³	24.0 ¹⁵	56.25 ¹⁶	6.9 ¹	57.04 ²⁴	29.7 ²¹
18.9	2.79 ¹⁴	44.0 ³¹	46.84 ¹⁷	22.4 ¹⁶	56.44 ¹⁹	7.0 ¹	57.35 ³¹	27.6 ²¹
28.9	3.00 ²¹	41.0 ³⁰	47.03 ¹⁹	21.0 ¹⁴	56.66 ²²	7.2 ²	57.73 ³⁸	25.6 ²⁰
Aug. 7.9	3.25 ²⁵	38.2 ²⁸	47.25 ²²	19.7 ¹³	56.91 ²⁵	7.3 ¹	58.16 ⁴³	23.8 ¹⁸
17.9	3.55 ³⁰	35.8 ²⁴	47.50 ²⁵	18.6 ¹¹	57.18 ²⁷	7.4 ¹	58.64 ⁴⁸	22.2 ¹⁶
27.8	3.89 ³⁴	33.8 ²⁰	47.76 ²⁶	17.7 ⁹	57.46 ²⁸	7.4 ⁰	59.16 ⁵²	20.8 ¹⁴
37		14	27	6	30	0	55	11
Sept. 6.8	4.26	32.4	48.03	17.1	57.76	7.4	59.71	19.7
16.8	4.66 ⁴⁰	31.5 ⁹	48.32 ²⁹	16.7 ⁴	58.08 ³²	7.3 ¹	60.29 ⁵⁸	18.8 ⁵
26.8	5.07 ⁴¹	31.2 ³	48.61 ²⁹	16.8 ¹	58.40 ³²	7.1 ²	60.89 ⁶⁰	18.3 ¹
Oct. 6.7	5.48 ⁴¹	31.6 ⁴	48.91 ³⁰	17.1 ³	58.72 ³²	6.8 ³	61.49 ⁶⁰	18.0 ³
16.7	5.89 ⁴¹	32.6 ¹⁰	49.20 ³⁰	17.8 ⁷	59.05 ³³	6.4 ⁴	62.10 ⁶¹	18.0 ⁶
26.7	6.28 ³⁹	32.6 ¹⁶	49.20 ³⁰	17.8 ¹⁰	59.05 ³²	6.4 ⁵	62.10 ⁵⁹	18.0 ⁴
Nov. 5.6	6.28	34.2	49.50	18.8	59.37	5.9	62.69	18.4
15.6	6.65 ³⁷	36.4 ²²	49.78 ²⁸	20.1 ¹³	59.68 ³¹	5.3 ⁶	63.26 ⁵⁷	19.1 ⁷
25.6	6.98 ³³	39.1 ²⁷	50.05 ²⁷	21.7 ¹⁶	59.97 ²⁹	4.8 ⁵	63.80 ⁵⁴	20.1 ¹⁰
35.6	7.26 ²⁸	42.2 ³¹	50.29 ²⁴	23.4 ¹⁷	60.25 ²⁸	4.2 ⁶	64.30 ⁵⁰	21.4 ¹³
Dec. 5.6	7.49 ²³	45.6 ³⁴	50.51 ²²	25.2 ¹⁸	60.49 ²⁴	3.7 ⁵	64.74 ⁴⁴	23.0 ¹⁶
15.5	7.66 ¹⁷	49.2 ³⁶	50.69 ¹⁸	27.1 ¹⁹	60.70 ²¹	3.3 ⁴	65.11 ³⁷	24.8 ¹⁸
25.5	7.76 ¹⁰	52.8 ³⁶	50.84 ¹⁵	29.0 ¹⁹	60.88 ¹⁸	2.9 ⁴	65.40 ²⁹	26.8 ²⁰
35.5	7.79 ³	56.4 ³⁶	50.94 ¹⁰	30.8 ¹⁸	61.00 ¹²	2.6 ³	65.60 ²⁰	29.0 ²²
Sec δ , Tan δ	1.648	-1.310	1.003	-0.082	1.066	+0.369	2.100	+1.846
Mean Place	3 ^h .901	56 ^m .20	45 ^h .790	31 ^m .38	* 54 ^h .979	0 ^m .97	55 ^h .621	26 ^m .63
D ^o ψ α , D ^o α	-0.03	-0.01	0.00	0.00	+0.01	0.00	+0.05	+0.08
D ^o δ , D ^o δ	0.0	+1.0	0.0	+1.0	0.0	+1.0	-0.1	+1.0

(Eph 15)

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	ξ ² Canis Majoris. Mag. 4.5		23 H. Camelop. Mag. 5.6		51 Aurigæ. Mag. 5.7		γ Geminorum. Mag. 1.9	
	Right Ascension.	Declination S.	Right Ascension.	Declination N.	Right Ascension.	Declination N.	Right Ascension.	Declination N.
	h m 6 31	° ' -22 53	h m 6 31	° ' +79 39	h m 6 32	° ' +39 27	h m 6 32	° ' +16 28
an. 0.5	31.56 ⁶	41.1 ²⁶	54.79 ²²	39.6 ³⁰	48.79 ¹²	66.6 ¹⁰	50.19 ¹⁰	27.4 ⁵
10.5	31.62 ¹	43.7 ²⁵	55.01 ³	42.6 ²⁹	48.91 ⁶	67.6 ¹⁰	50.29 ¹⁰	26.9 ³
20.4	31.63 ⁴	46.2 ²²	54.98 ²⁷	45.5 ²⁷	48.97 ¹	68.6 ¹⁰	50.34 ⁰	26.6 ²
30.4	31.59 ⁸	48.4 ¹⁹	54.71 ⁵⁰	48.2 ²⁵	48.96 ⁶	69.6 ¹⁰	50.34 ⁴	26.4 ²
eb. 9.4	31.51 ¹³	50.3 ¹⁵	54.21 ⁷¹	50.7 ²¹	48.90 ¹²	70.6 ⁹	50.30 ⁹	26.2 ¹
19.4	31.38 ¹⁶	51.8 ¹²	53.50 ⁸⁷	52.8 ¹⁷	48.78 ¹⁶	71.5 ⁷	50.21 ¹³	26.1 ⁰
ar. 1.3	31.22 ¹⁸	53.0 ⁹	52.63 ⁹⁹	54.5 ¹²	48.62 ¹⁹	72.2 ⁵	50.08 ¹⁵	26.1 ⁰
11.3	31.04 ²⁰	53.9 ⁴	51.64 ¹⁰⁷	55.7 ⁶	48.43 ²¹	72.7 ³	49.93 ¹⁷	26.1 ⁰
21.3	30.84 ²⁰	54.3 ¹	50.57 ¹⁰⁹	56.3 ¹	48.22 ²¹	73.0 ¹	49.76 ¹⁷	26.1 ⁰
31.2	30.64 ¹⁹	54.4 ³	49.48 ¹⁰⁶	56.4 ⁵	48.01 ²¹	73.1 ¹	49.59 ¹⁶	26.2 ⁰
or. 10.2	30.45 ¹⁸	54.1 ⁶	48.42 ⁹⁹	55.9 ¹¹	47.80 ¹⁹	73.0 ⁴	49.43 ¹⁵	26.2 ¹
20.2	30.27 ¹⁵	53.5 ⁹	47.43 ⁸⁸	54.8 ¹⁶	47.61 ¹⁵	72.6 ⁶	49.28 ¹²	26.3 ⁰
30.2	30.12 ¹³	52.6 ¹³	46.55 ⁷³	53.2 ¹⁹	47.46 ¹²	72.0 ⁷	49.16 ⁹	26.3 ¹
ly 10.1	29.99 ⁹	51.3 ¹⁶	45.82 ⁵⁶	51.3 ²³	47.34 ⁷	71.3 ¹⁰	49.07 ⁵	26.4 ¹
20.1	29.90 ⁵	49.7 ¹⁸	45.26 ³⁶	49.0 ²⁶	47.27 ³	70.4 ¹⁰	49.02 ²	26.5 ²
30.1	29.85 ⁰	47.9 ²¹	44.90 ¹⁵	46.4 ²⁹	47.24 ⁸	69.4 ¹⁰	49.00 ³	26.7 ²
ne 9.1	29.85 ³	45.8 ²²	44.75 ⁶	43.5 ²⁹	47.27 ⁸	68.4 ¹¹	49.03 ⁷	26.9 ²
19.0	29.88 ⁷	43.6 ²³	44.81 ²⁷	40.6 ³⁰	47.35 ¹³	67.3 ¹¹	49.10 ¹⁰	27.1 ³
29.0	29.95 ¹¹	41.3 ²⁴	45.08 ⁴⁸	37.6 ²⁹	47.48 ¹⁷	66.2 ¹⁰	49.20 ¹⁵	27.4 ³
ly 9.0	30.06 ¹⁵	38.9 ²³	45.56 ⁶⁷	34.7 ²⁸	47.65 ²²	65.2 ¹⁰	49.35 ¹⁸	27.7 ³
18.9	30.21 ¹⁸	36.6 ²²	46.23 ⁸⁴	31.9 ²⁷	47.87 ²⁵	64.2 ¹⁰	49.53 ²⁰	28.0 ³
28.9	30.39 ²¹	34.4 ²⁰	47.07 ¹⁰¹	29.2 ²⁴	48.12 ²⁹	63.2 ⁸	49.73 ²⁴	28.3 ²
ig. 7.9	30.60 ²⁴	32.4 ¹⁸	48.08 ¹¹⁵	26.8 ²¹	48.41 ³¹	62.4 ⁸	49.97 ²⁶	28.5 ²
17.9	30.84 ²⁶	30.6 ¹⁴	49.23 ¹²⁷	24.7 ¹⁸	48.72 ³⁴	61.6 ⁷	50.23 ²⁷	28.7 ⁰
27.8	31.10 ²⁷	29.2 ¹¹	50.50 ¹³⁶	22.9 ¹⁵	49.06 ³⁶	60.9 ⁷	50.50 ²⁹	28.9 ⁰
pt. 6.8	31.37 ²⁹	28.1 ⁶	51.86 ¹⁴⁴	21.4 ¹¹	49.42 ³⁷	60.2 ⁵	50.79 ³⁰	28.9 ¹
16.8	31.66 ³⁰	27.5 ²	53.30 ¹⁴⁹	20.3 ⁷	49.79 ³⁸	59.7 ⁵	51.09 ³¹	28.8 ²
26.8	31.96 ³¹	27.3 ⁴	54.79 ¹⁵¹	19.6 ²	50.17 ³⁹	59.2 ³	51.40 ³²	28.6 ⁴
t. 6.7	32.27 ³¹	27.7 ⁸	56.30 ¹⁵¹	19.4 ²	50.56 ³⁹	58.9 ³	51.72 ³²	28.2 ⁵
16.7	32.58 ³⁰	28.5 ¹³	57.81 ¹⁴⁷	19.6 ⁶	50.95 ³⁹	58.6 ¹	52.04 ³²	27.7 ⁶
26.7	32.88 ²⁹	29.8 ¹⁸	59.28 ¹⁴¹	20.2 ¹¹	51.34 ³⁸	58.5 ⁰	52.36 ³⁰	27.1 ⁸
ov. 5.6	33.17 ²⁸	31.6 ²¹	60.69 ¹³¹	21.3 ¹⁵	51.72 ³⁶	58.5 ²	52.66 ³⁰	26.3 ⁷
15.6	33.45 ²⁵	33.7 ²⁴	62.00 ¹¹⁷	22.8 ¹⁹	52.08 ³⁴	58.7 ³	52.96 ²⁷	25.6 ⁸
25.6	33.70 ²²	36.1 ²⁶	63.17 ¹⁰²	24.7 ²²	52.42 ³⁰	59.0 ⁵	53.23 ²⁵	24.8 ⁸
ec. 5.6	33.92 ¹⁸	38.7 ²⁸	64.19 ⁸³	26.9 ²⁵	52.72 ²⁶	59.5 ⁶	53.48 ²²	24.0 ⁷
15.5	34.10 ¹⁴	41.5 ²⁸	65.02 ⁶¹	29.4 ²⁸	52.98 ²¹	60.1 ⁸	53.70 ¹⁷	23.3 ⁷
25.5	34.24 ⁹	44.3 ²⁷	65.63 ³⁷	32.2 ²⁹	53.19 ¹⁵	60.9 ⁹	53.87 ¹³	22.6 ⁵
35.5	34.33	47.0	66.00	35.1	53.34	61.8	54.00	22.1
c δ, Tan δ	1.086	-0.422	5.572	+5.481	1.295	+0.823	1.043	+0.206
ean Place	29°.654	46''.43	44°.976	32''.76	46°.215	60''.74	48°.129	21''.89
φ α, Δ α	-0.01	0.00	+0.14	+0.05	+0.02	+0.01	+0.01	0.00
φ δ, Δ δ	-0.1	+1.0	-0.1	+1.0	-0.1	+1.0	-0.1	+1.0

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	γ Argūs. Mag. 3.2		S Monocerotis. Mag. 4.7		ε Geminorum. Mag. 3.2		ξ Geminorum. Mag. 3.4	
	Right Ascension.	Declination S.	Right Ascension.	Declination N.	Right Ascension.	Declination N.	Right Ascension.	Declination N.
	h m	° ' "	h m	° ' "	h m	° ' "	h m	° ' "
	6 35	-43 6	6 36	+ 9 58	6 38	+25 12	6 40	+12 54
Jan. 0.5	11.84	69.8	19.83	36.2	44.42	64.0	33.19	22.6
10.5	11.87 3	73.1 33	19.93 10	35.3 9	44.53 11	64.1 1	33.29 10	21.9
20.4	11.84 3	76.2 31	19.98 5	34.6 7	44.59 6	64.3 2	33.35 6	21.4
30.4	11.75 9	79.1 29	19.98 0	34.0 6	44.60 1	64.5 2	33.35 0	20.9
Feb. 9.4	11.60 15	81.7 26	19.93 5	33.5 5	44.55 5	64.8 3	33.31 4	20.6
19.4	11.41 19	83.8 21	19.84 9	33.1 4	44.46 9	65.1 3	33.23 8	20.3
Mar. 1.3	11.18 23	85.4 16	19.72 12	32.9 2	44.33 13	65.4 3	33.11 12	20.2
11.3	10.92 26	86.6 12	19.58 14	32.8 1	44.17 16	65.6 2	32.96 15	20.1
21.3	10.65 27	87.4 8	19.42 16	32.7 1	44.00 17	65.8 2	32.80 16	20.1
31.3	10.37 28	87.6 2	19.25 17	32.7 0	43.82 18	65.9 1	32.63 17	20.2
Apr. 10.2	10.09 28	87.3 3	19.09 16	32.8 1	43.65 17	65.9 0	32.47 16	20.3
20.2	9.83 26	86.6 7	18.94 15	33.0 2	43.49 16	65.8 1	32.32 15	20.4
30.2	9.60 23	85.4 12	18.82 12	33.2 2	43.36 13	65.7 1	32.19 13	20.5
May 10.1	9.41 19	83.8 16	18.72 10	33.5 3	43.26 10	65.5 2	32.10 9	20.7
20.1	9.25 16	81.8 20	18.67 5	33.9 4	43.20 6	65.2 3	32.04 6	21.0
30.1	9.14 11	79.5 23	18.65 2	34.4 5	43.18 2	64.9 3	32.02 2	21.3
June 9.1	9.07 7	76.9 26	18.67 2	34.9 5	43.20 2	64.7 2	32.04 2	21.6
19.0	9.06 1	74.0 29	18.73 6	35.5 6	43.27 7	64.4 3	32.10 6	22.0
29.0	9.10 4	71.1 29	18.83 10	36.1 6	43.38 11	64.1 3	32.19 9	22.5
July 9.0	9.18 8	68.1 30	18.96 13	36.8 7	43.52 14	63.9 2	32.33 14	23.0
19.0	9.32 14	65.1 30	19.13 17	37.4 6	43.70 18	63.6 3	32.49 16	23.4
28.9	9.50 18	62.3 28	19.33 20	38.1 7	43.92 22	63.4 2	32.69 20	23.9
Aug. 7.9	9.72 22	59.7 26	19.55 22	38.7 6	44.16 24	63.2 2	32.91 22	24.3
17.9	9.97 25	57.3 24	19.80 25	39.1 4	44.43 27	63.0 2	33.16 25	24.6
27.8	10.26 29	55.4 19	20.06 26	39.5 4	44.72 29	62.8 2	33.42 26	24.8
Sept. 6.8	10.58 32	54.0 14	20.34 28	39.7 2	45.03 31	62.5 3	33.70 28	24.9
16.8	10.92 34	53.1 9	20.63 29	39.7 0	45.35 32	62.2 3	34.00 30	24.8
26.8	11.27 35	52.7 4	20.93 30	39.5 2	45.68 33	61.8 4	34.30 30	24.6
Oct. 6.7	11.63 36	52.9 2	21.24 31	39.1 4	46.01 33	61.4 4	34.61 31	24.2
16.7	11.99 36	53.8 15	21.55 31	38.5 6	46.35 34	61.0 4	34.93 32	23.6
26.7	12.34 35	55.3 15	21.86 31	38.5 8	46.69 34	60.5 5	35.24 31	22.8
Nov. 5.7	12.67 33	57.3 20	22.16 30	37.7 9	46.99 33	60.0 5	35.54 30	22.0
15.6	12.98 31	59.9 26	22.44 28	36.8 10	47.02 33	59.5 5	35.84 30	21.0
25.6	13.26 28	62.8 28	22.71 27	35.8 11	47.33 30	59.1 4	36.11 27	20.0
Dec. 5.6	13.49 23	66.0 32	22.95 24	34.7 12	47.63 27	58.8 3	36.36 25	19.0
15.5	13.67 18	69.4 34	23.16 21	33.5 11	47.90 23	58.4 2	36.58 22	18.1
25.5	13.80 13	72.9 35	23.33 17	32.4 10	48.13 19	58.6 2	36.75 17	17.2
35.5	13.87 7	76.3 34	23.46 13	31.4 10	48.47 15	58.4 0	36.89 14	16.4
Sec δ, Tan δ	1.370	-0.936	1.015	+0.176	1.105	+0.471	1.026	+0.237
Mean Place	9 ^h .709	75 ^m .40	17 ^h .836	30 ^m .86	42 ^h .204	58 ^m .74	31 ^h .160	17 ^m .48
D'ψ α, Dω α	-0.02	-0.01	0.00	0.00	+0.01	+0.01	+0.01	0.00
Dψ δ, Dω δ	-0.1	+1.0	-0.1	+1.0	-0.1	+1.0	-0.1	+1.0

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	γ^s Aurigæ. Mag. 5.3		α Canis Majoris. (Sirius.) Mag. -1.6		18 Monocerotis. Mag. 4.7		43 Camelop. Mag. 5.1	
	Right Ascension.	Declination N.	Right Ascension.	Declination S.	Right Ascension.	Declination N.	Right Ascension.	Declination N.
	h m	s	h m	s	h m	s	h m	s
	6 40	+43 39	6 41	-16 35	6 43	+2 30	6 44	+68 59
	s	"	s	"	s	"	s	"
Jan. 0.5	39.71	52.7	25.88	51.0	27.64	26.9	38.09	25.2
10.5	39.84 ¹³	53.9 ¹²	25.96 ⁸	53.4 ²⁴	27.74 ¹⁰	25.6 ¹³	38.28 ¹⁹	27.7 ²⁵
20.4	39.91 ⁷	55.2 ¹³	25.98 ²	55.6 ²⁰	27.79 ⁵	24.4 ¹²	38.35 ⁷	30.3 ²⁶
30.4	39.91 ⁰	56.5 ¹³	25.96 ²	57.6 ²⁰	27.79 ⁰	23.4 ¹⁰	38.29 ⁶	32.7 ²⁴
Feb. 9.4	39.85 ⁶	57.7 ¹²	25.89 ⁷	59.3 ¹⁷	27.75 ⁴	22.5 ⁹	38.11 ¹⁸	35.0 ²³
	12	11	11	14	9	7	29	20
19.4	39.73	58.8	25.78	60.7	27.66	21.8	37.82	37.0
Mar. 1.3	39.56	59.7 ⁹	25.63 ¹⁵	61.8 ¹¹	27.54 ¹²	21.3 ⁵	37.43 ³⁹	38.6 ¹⁶
11.3	39.36	60.4 ⁷	25.46 ¹⁷	62.6 ⁸	27.40 ¹⁴	21.0 ³	36.98 ⁴⁵	39.8 ¹²
21.3	39.14	60.8 ⁴	25.28 ¹⁸	63.1 ⁵	27.24 ¹⁶	20.8 ²	36.48 ⁵⁰	40.6 ⁸
31.3	38.91 ²³	61.0 ²	25.09 ¹⁹	63.2 ¹	27.07 ¹⁷	20.8 ⁰	35.97 ⁵¹	40.8 ²
	22	1	18	2	16	1	51	3
Apr. 10.2	38.69	60.9	24.91	63.0	26.91	20.9	35.46	40.5
20.2	38.48	60.5 ⁴	24.74 ¹⁷	62.5 ⁵	26.76 ¹⁵	21.2 ³	34.99 ⁴⁷	39.8 ⁷
30.2	38.30	59.9 ⁶	24.60 ¹⁴	61.7 ⁸	26.63 ¹³	21.6 ⁴	34.57 ⁴²	38.6 ¹²
May 10.1	38.17 ¹³	59.1 ⁸	24.49 ¹¹	60.6 ¹¹	26.53 ¹⁰	22.1 ⁵	34.22 ³⁵	37.1 ¹⁵
20.1	38.08 ⁹	58.1 ¹⁰	24.41 ⁸	59.3 ¹³	26.47 ⁶	22.8 ⁷	33.96 ²⁶	35.2 ¹⁹
	4	12	5	15	3	8	16	22
30.1	38.04	56.9	24.36	57.8	26.44	23.6	33.80	33.0
June 9.1	38.06 ²	55.6 ¹³	24.35 ¹	56.0 ¹⁸	26.45 ¹	24.5 ⁹	33.74 ⁶	30.6 ²⁴
19.0	38.13 ⁷	54.3 ¹³	24.39 ⁴	54.1 ¹⁹	26.50 ⁵	25.5 ¹⁰	33.79 ⁵	28.1 ²⁵
29.0	38.25 ¹²	53.0 ¹³	24.46 ⁷	52.2 ¹⁹	26.59 ⁹	26.5 ¹⁰	33.94 ¹⁵	25.5 ²⁶
July 9.0	38.42 ¹⁷	51.7 ¹³	24.57 ¹¹	50.2 ²⁰	26.71 ¹²	27.5 ¹⁰	34.20 ²⁶	22.9 ²⁶
	22	12	15	20	16	11	35	25
19.0	38.64	50.5	24.72	48.2	26.87	28.6	34.55	20.4
28.9	38.90 ²⁶	49.3 ¹²	24.90 ¹⁸	46.3 ¹⁹	27.05 ¹⁸	29.6 ¹⁰	34.99 ⁴⁴	18.1 ²³
Aug. 7.9	39.19	48.1 ¹²	25.10 ²⁰	44.6 ¹⁷	27.26 ²¹	30.5 ⁹	35.51 ⁵²	15.9 ²²
17.9	39.52 ³³	47.1 ¹⁰	25.33 ²³	43.1 ¹⁵	27.49 ²³	31.3 ⁸	36.09 ⁵⁸	13.9 ²⁰
27.8	39.87 ³⁵	46.2 ⁹	25.58 ²⁵	41.9 ¹²	27.74 ²⁵	31.9 ⁶	36.74 ⁶⁵	12.1 ¹⁸
	37	9	27	8	27	4	70	15
Sept. 6.8	40.24	45.3	25.85	41.1	28.01	32.3	37.44	10.6
16.8	40.63 ³⁹	44.6 ⁷	26.13 ²⁸	40.6 ⁵	28.29 ²⁸	32.5 ²	38.18 ⁷⁴	9.5 ¹¹
26.8	41.04 ⁴¹	44.1 ⁵	26.42 ²⁹	40.5 ¹	28.59 ³⁰	32.4 ¹	38.94 ⁷⁶	8.6 ⁹
Oct. 6.7	41.46 ⁴²	43.6 ⁵	26.72 ³⁰	40.9 ⁴	28.89 ³⁰	32.0 ⁴	39.72 ⁷⁸	8.2 ⁴
16.7	41.87 ⁴¹	43.3 ³	27.02 ³⁰	41.8 ⁹	29.19 ³⁰	31.3 ⁷	40.51 ⁷⁹	8.1 ¹
	41	1	30	13	30	10	78	3
26.7	42.28	43.2	27.32	43.1	29.49	30.3	41.29	8.4
Nov. 5.7	42.69 ⁴¹	43.3 ¹	27.61 ²⁹	44.7 ¹⁶	29.78 ²⁹	29.2 ¹¹	42.05 ⁷⁶	9.0 ⁶
15.6	43.08 ³⁹	43.5 ²	27.89 ²⁸	46.7 ²⁰	30.07 ²⁹	27.9 ¹³	42.76 ⁷¹	10.1 ¹¹
25.6	43.44 ³⁶	44.0 ⁵	28.14 ²⁵	49.0 ²³	30.33 ²⁶	26.4 ¹⁵	43.42 ⁶⁶	11.5 ¹⁴
Dec. 5.6	43.76 ³²	44.6 ⁶	28.36 ²²	51.4 ²⁴	30.57 ²⁴	24.8 ¹⁶	44.00 ⁵⁸	13.2 ¹⁷
	29	8	19	26	21	15	50	21
15.5	44.05	45.4	28.55	54.0	30.78	23.3	44.50	15.3
25.5	44.28 ²³	46.4 ¹⁰	28.70 ¹⁵	56.6 ²⁶	30.95 ¹⁷	21.8 ¹⁵	44.89 ³⁹	17.6 ²³
35.5	44.45 ¹⁷	47.6 ¹²	28.80 ¹⁰	59.1 ²⁵	31.08 ¹³	20.4 ¹⁴	45.16 ²⁷	20.0 ²⁴
Sec δ , Tan δ	1.382	+0.954	1.043	-0.298	1.001	+0.044	2.789	+2.604
Mean Place	36 ^s .961	47 ^m .46	24 ^s .147	55 ^m .77	25 ^s .707	21 ^m .80	32 ^s .874	19 ^m .96
D ⁺ ϕ α , D ₀ α	+0.02	+0.01	-0.01	0.00	0.00	0.00	+0.07	+0.03
D ⁺ ϕ δ , D ₀ δ	-0.1	+1.0	-0.1	+1.0	-0.1	+1.0	-0.1	+1.0

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	ζ Mensæ. Mag. 5.6		θ Geminorum. Mag. 3.6		α Pictoris. Mag. 3.3		1
	Right Ascension.	Declination S.	Right Ascension.	Declination N.	Right Ascension.	Declination S.	Right Ascension.
	h m s	° ' "	h m s	° ' "	h m s	° ' "	h m s
	6 46	-80 43	6 47	+34 3	6 47	-61 50	6 4
Jan. 0.5	75.37	23.0	13.75	58.1	22.05	53.5	51.8
10.5	75.07 ³⁰	26.5 ³⁵	13.88 ¹³	58.7 ⁶	22.04 ¹	57.2 ³⁷	51.9 ²
20.5	74.52 ⁵⁵	30.0 ³⁵	13.96 ⁸	59.4 ⁷	21.93 ¹¹	60.7 ³⁵	51.8 ¹
30.4	73.73 ⁷⁹	33.3 ³³	13.97 ¹	60.1 ⁷	21.74 ¹⁹	64.0 ³³	51.7 ¹
Feb. 9.4	72.73 ¹⁰⁰	36.2 ²⁹	13.93 ⁴	60.9 ⁸	21.47 ²⁷	66.9 ²⁹	51.6 ¹
19.4	71.55 ¹¹⁸	38.7 ²⁵	13.83 ¹⁰	61.6 ⁷	21.13 ³⁴	69.4 ²⁵	51.3 ¹
Mar. 1.3	70.21 ¹³⁴	40.8 ²¹	13.70 ¹³	62.2 ⁶	20.73 ⁴⁰	71.4 ²⁰	51.1 ¹
11.3	68.77 ¹⁴⁴	42.4 ¹⁶	13.53 ¹⁷	62.7 ⁵	20.29 ⁴⁴	73.0 ¹⁶	50.8 ¹
21.3	67.26 ¹⁵¹	43.5 ¹¹	13.34 ¹⁹	63.1 ⁴	19.83 ⁴⁶	74.0 ¹⁰	50.4 ¹
31.3	65.72 ¹⁵⁴	44.0 ⁵	13.14 ²⁰	63.2 ¹	19.35 ⁴⁸	74.5 ⁵	50.1 ¹
Apr. 10.2	64.18 ¹⁵⁴	44.0 ⁰	12.95 ¹⁹	63.2 ⁰	18.87 ⁴⁸	74.4 ¹	49.8 ¹
20.2	62.68 ¹⁵⁰	43.6 ⁴	12.78 ¹⁷	63.1 ¹	18.41 ⁴⁶	73.8 ⁶	49.5 ¹
30.2	61.26 ¹⁴²	42.6 ¹⁰	12.63 ¹⁵	62.7 ⁴	17.99 ⁴²	72.7 ¹¹	49.2 ¹
May 10.2	59.95 ¹³¹	41.2 ¹⁴	12.51 ¹²	62.2 ⁵	17.61 ³⁸	71.2 ¹⁵	48.9 ¹
20.1	58.78 ¹¹⁷	39.3 ¹⁹	12.43 ⁸	61.6 ⁶	17.28 ³³	69.2 ²⁰	48.7 ¹
30.1	57.77 ¹⁰¹	37.0 ²³	12.40 ³	60.9 ⁷	17.01 ²⁷	66.8 ²⁴	48.6 ¹
June 9.1	56.95 ⁸²	34.4 ²⁹	12.41 ¹	60.2 ⁷	16.82 ¹⁹	64.1 ²⁷	48.4 ¹
19.0	56.33 ⁶²	31.5 ²⁶	12.47 ⁶	59.4 ⁸	16.69 ¹³	61.1 ³⁰	48.4 ¹
29.0	55.94 ³⁹	28.5 ³⁰	12.58 ¹¹	58.6 ⁸	16.64 ⁵	57.9 ³²	48.4 ¹
July 9.0	55.78 ¹⁶	25.3 ³²	12.73 ¹⁵	57.8 ⁸	16.67 ³	54.7 ³²	48.4 ¹
19.0	55.85 ⁷	22.1 ³²	12.92 ¹⁹	57.1 ⁷	16.78 ¹¹	51.4 ³³	48.6 ¹
28.9	56.15 ³⁰	19.0 ³¹	13.14 ²²	56.3 ⁸	16.96 ¹⁸	48.3 ³¹	48.7 ¹
Aug. 7.9	56.68 ⁵³	16.1 ²⁹	13.40 ²⁶	55.6 ⁷	17.21 ²⁵	45.3 ³⁰	48.9 ¹
17.9	57.41 ⁷³	13.5 ²⁶	13.68 ²⁸	54.9 ⁷	17.53 ³²	42.7 ²⁶	49.2 ¹
27.9	58.34 ⁹³	11.2 ²³	13.99 ³¹	54.3 ⁶	17.90 ³⁷	40.4 ²³	49.5 ¹
Sept. 6.8	59.43 ¹⁰⁹	9.4 ¹⁸	14.32 ³³	53.7 ⁶	18.33 ⁴³	38.7 ¹⁷	49.8 ¹
16.8	60.64 ¹²¹	8.2 ¹²	14.66 ³⁴	53.1 ⁶	18.79 ⁴⁶	37.5 ¹²	50.2 ¹
26.8	61.95 ¹³¹	7.5 ⁷	15.01 ³⁵	52.5 ⁶	19.28 ⁴⁹	36.9 ⁶	50.6 ¹
Oct. 6.7	63.29 ¹³⁴	7.5 ⁰	15.38 ³⁷	52.0 ⁵	19.79 ⁵¹	36.9 ⁰	51.0 ¹
16.7	64.64 ¹³⁵	8.1 ⁶	15.75 ³⁷	51.6 ⁴	20.30 ⁵¹	37.6 ⁷	51.4 ¹
26.7	65.93 ¹²⁹	9.4 ¹³	16.12 ³⁷	51.2 ⁴	20.80 ⁵⁰	39.0 ¹⁴	51.8 ¹
Nov. 5.7	67.12 ¹¹⁹	11.3 ¹⁹	16.48 ³⁶	50.9 ³	21.27 ⁴⁷	41.0 ²⁰	52.2 ¹
15.6	68.17 ¹⁰⁵	13.7 ²⁴	16.82 ³⁴	50.7 ²	21.70 ⁴³	43.5 ²⁵	52.5 ¹
25.6	69.03 ⁸⁶	16.5 ²⁸	17.15 ³³	50.6 ¹	22.07 ³⁷	46.5 ³⁰	52.8 ¹
Dec. 5.6	69.68 ⁶⁵	19.8 ³³	17.45 ³⁰	50.7 ¹	22.37 ³⁰	49.9 ³⁴	53.1 ¹
15.6	70.08 ⁴⁰	23.3 ³⁵	17.71 ²⁶	50.9 ²	22.60 ²³	53.5 ³⁶	53.3 ¹
25.5	70.21 ¹³	27.0 ³⁷	17.93 ²²	51.3 ⁴	22.73 ¹³	57.3 ³⁸	53.4 ¹
35.5	70.09 ¹²	30.6 ³⁶	18.09 ¹⁶	51.8 ⁵	22.78 ⁵	61.0 ³⁷	53.5 ¹
Sec δ , Tan δ	6.204	-6.123	1.207	+0.676	2.119	-1.869	1.1
Mean Place	68°.432	30°.15	11°.329	53°.33	19°.240	60°.16	49°.1
D' ψ α , D ₀ α	-0.16	-0.08	+0.02	+0.01	-0.05	-0.03	-0.1
D ψ δ , D ₀ δ	-0.1	+1.0	-0.1	+1.0	-0.1	+1.0	-0.1

[Eph 15]

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	15 Lyncis. Mag. 4.5		θ Canis Majoris. Mag. 4.2		ε Canis Majoris. Mag. 1.6		ζ Geminorum. Var. 3.7-4.3	
	Right Ascension.	Declination N.	Right Ascension.	Declination S.	Right Ascension.	Declination S.	Right Ascension.	Declination N.
	h m 6 49	° ' +58 31	h m 6 50	° ' -11 55	h m 6 55	° ' -28 51	h m 6 59	° ' +20 41
	s "	"	s "	"	s "	"	s "	"
Jan. 0.5	59.11	72.7	16.34	47.2	19.01	14.6	6.27	49.4
10.5	59.28 ¹⁷	74.7 ²⁰	16.44 ¹⁰	49.4 ²²	19.09 ⁸	17.6 ³⁰	6.40 ¹³	49.2
20.5	59.36 ⁸	76.7 ²⁰	16.48 ⁴	51.4 ²⁰	19.12 ³	20.4 ²⁸	6.48 ⁸	49.1
30.4	59.36 ⁰	78.7 ²⁰	16.47 ¹	53.2 ¹⁸	19.09 ³	23.0 ²⁶	6.50 ²	49.0
Feb. 9.4	59.26 ¹⁰	80.6 ¹⁹	16.42 ⁵	54.8 ¹⁶	19.01 ⁸	25.3 ²³	6.47 ³	49.1
	59.26 ¹⁷	80.6 ¹⁷	16.42 ⁹	54.8 ¹³	19.01 ¹²	25.3 ¹⁹	6.47 ⁷	49.1
Mar. 19.4	59.09	82.3	16.33	56.1	18.89	27.2	6.40	49.2
1.3	58.85 ²⁴	83.7 ¹⁴	16.20 ¹³	57.1 ¹⁰	18.73 ¹⁶	28.7 ¹⁵	6.29 ¹¹	49.4
11.3	58.56 ²⁹	84.8 ¹¹	16.05 ¹⁵	57.8 ⁷	18.55 ¹⁸	29.9 ¹²	6.15 ¹⁴	49.6
21.3	58.24 ³²	85.5 ⁷	15.88 ¹⁷	58.2 ⁴	18.34 ²¹	30.6 ⁷	5.99 ¹⁶	49.8
31.3	57.90 ³⁴	85.8 ³	15.70 ¹⁸	58.3 ¹	18.13 ²¹	31.0 ⁴	5.82 ¹⁷	49.9
	57.90 ³³	85.8 ¹	15.70 ¹⁸	58.3 ¹	18.13 ²¹	31.0 ¹	5.82 ¹⁷	49.9
Apr. 10.2	57.57	85.7	15.52	58.2	17.92	30.9	5.65	50.0
20.2	57.26 ³¹	85.2 ⁵	15.36 ¹⁶	57.8 ⁴	17.72 ²⁰	30.4 ⁵	5.49 ¹⁶	50.1
30.2	56.99 ²⁷	84.3 ⁹	15.22 ¹⁴	57.1 ⁷	17.54 ¹⁸	29.6 ⁸	5.35 ¹⁴	50.1
May 10.2	56.77 ²²	83.0 ¹³	15.10 ¹²	56.2 ⁹	17.39 ¹⁵	28.4 ¹²	5.25 ¹⁰	50.1
20.1	56.61 ¹⁶	81.5 ¹⁵	15.02 ⁸	55.1 ¹¹	17.27 ¹²	26.8 ¹⁶	5.17 ⁸	50.1
	56.61 ¹⁰	81.5 ¹⁸	15.02 ⁴	55.1 ¹⁴	17.27 ⁸	26.8 ¹⁹	5.17 ³	50.1
June 30.1	56.51	79.7	14.98	53.7	17.19	24.9	5.14	50.0
9.1	56.49 ²	77.8 ¹⁹	14.97 ¹	52.2 ¹⁵	17.15 ⁴	22.8 ²¹	5.15 ¹	50.0
19.0	56.55 ⁶	75.7 ²¹	15.00 ³	50.6 ¹⁶	17.15 ⁰	20.5 ²³	5.19 ⁴	49.9
29.0	56.67 ¹²	73.6 ²¹	15.07 ⁷	48.8 ¹⁸	17.19 ⁴	18.1 ²⁴	5.27 ⁸	49.9
July 9.0	56.86 ¹⁹	71.5 ²¹	15.17 ¹⁰	47.0 ¹⁸	17.27 ⁸	15.6 ²⁵	5.40 ¹³	49.8
	56.86 ²⁶	71.5 ²¹	15.17 ¹³	47.0 ¹⁸	17.27 ¹²	15.6 ²⁵	5.40 ¹⁶	49.8
19.0	57.12	69.4	15.30	45.2	17.39	13.1	5.56	49.8
28.9	57.44 ³²	67.4 ²⁰	15.47 ¹⁷	43.5 ¹⁷	17.55 ¹⁶	10.7 ²⁴	5.74 ¹⁸	49.8
Aug. 7.9	57.81 ³⁷	65.6 ¹⁸	15.67 ²⁰	41.9 ¹⁶	17.74 ¹⁹	8.4 ²³	5.96 ²²	49.7
17.9	58.23 ⁴²	63.8 ¹⁸	15.89 ²²	40.5 ¹⁴	17.96 ²²	6.4 ²⁰	6.21 ²⁵	49.5
27.9	58.68 ⁴⁵	62.3 ¹⁵	16.13 ²⁴	39.4 ¹¹	18.21 ²⁵	4.7 ¹⁷	6.47 ²⁶	49.3
	58.68 ⁵⁰	62.3 ¹³	16.13 ²⁶	39.4 ⁸	18.21 ²⁷	4.7 ¹³	6.47 ²⁸	49.3
Sept. 6.8	59.18	61.0	16.39	38.6	18.48	3.4	6.75	49.1
16.8	59.70 ⁵²	59.9 ¹¹	16.67 ²⁸	38.1 ⁵	18.77 ²⁹	2.6 ⁸	7.05 ³⁰	48.7
26.8	60.24 ⁵⁴	59.1 ⁸	16.96 ²⁹	38.1 ⁰	19.08 ³¹	2.3 ³	7.37 ³²	48.2
Oct. 6.7	60.79 ⁵⁵	58.5 ⁶	17.26 ³⁰	38.4 ³	19.39 ³¹	2.5 ²	7.69 ³²	47.7
16.7	61.35 ⁵⁶	58.2 ³	17.56 ³⁰	39.1 ⁷	19.71 ³²	3.2 ⁷	8.02 ³³	47.0
	61.35 ⁵⁵	58.2 ⁰	17.56 ³⁰	39.1 ¹²	19.71 ³²	3.2 ¹³	8.02 ³³	47.0
26.7	61.90	58.2	17.86	40.3	20.03	4.5	8.35	46.3
Nov. 5.7	62.44 ⁵⁴	58.6 ⁴	18.15 ²⁹	41.8 ¹⁵	20.34 ³¹	6.2 ¹⁷	8.67 ³²	45.6
15.6	62.96 ⁵²	59.2 ⁶	18.43 ²⁸	43.6 ¹⁸	20.64 ³⁰	8.4 ²²	8.99 ³²	44.8
25.6	63.45 ⁴⁹	60.2 ¹⁰	18.69 ²⁶	45.6 ²⁰	20.91 ²⁷	11.0 ²⁶	9.29 ³⁰	44.0
Dec. 5.6	63.88 ⁴³	61.4 ¹²	18.93 ²⁴	47.8 ²²	21.15 ²⁴	13.8 ²⁸	9.57 ²⁸	43.3
	63.88 ³⁸	61.4 ¹⁶	18.93 ²⁰	47.8 ²³	21.15 ²¹	13.8 ³⁰	9.57 ²⁴	43.3
15.6	64.26	63.0	19.13	50.1	21.36	16.8	9.81	42.7
25.5	64.57 ³¹	64.7 ¹⁷	19.30 ¹⁷	52.4 ²³	21.52 ¹⁶	19.8 ³⁰	10.02 ²¹	42.2
35.5	64.79 ²²	66.6 ¹⁹	19.42 ¹²	54.7 ²³	21.63 ¹¹	22.9 ³¹	10.18 ¹⁶	41.9
Sec δ, Tan δ	1.916	+1.634	1.022	-0.211	1.142	-0.551	1.069	+0.378
Mean Place	55°.390	68''.08	14°.472	52''.50	17°.102	20''.52	4°.127	45''.29
D ₁ δ, D ₁ α	+0.04	+0.02	-0.01	0.00	-0.01	-0.01	+0.01	+0.01
D ₂ δ, D ₂ α	-0.1	+1.0	-0.1	+1.0	-0.1	+1.0	-0.1	+1.0

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	α Canis Majoris. Mag. 3.1		γ Canis Majoris. Mag. 4.1		δ Canis Majoris. Mag. 2.0		63 Aurigæ. Mag. 5.1	
	Right Ascension.	Declination S.	Right Ascension.	Declination S.	Right Ascension.	Declination S.	Right Ascension.	Declination N.
	h m 6 59	° ' " -23 42	h m 6 59	° ' " -15 30	h m 7 4	° ' " -26 15	h m 7 5	° ' " +39 27
Jan. 0.5	30.39	24.3	56.65	19.5	57.94	21.2	51.33	40.3
10.5	30.48 ⁹	27.0 ²⁷	56.75 ¹⁰	21.9 ²⁴	58.03 ⁹	24.1 ²⁹	51.49 ¹⁶	41.2 ⁹
20.5	30.52 ⁴	29.6 ²⁶	56.80 ⁵	24.1 ²⁰	58.07 ⁴	26.9 ²⁸	51.59 ¹⁰	42.2 ¹⁰
30.4	30.50 ²	32.0 ²⁴	56.80 ⁰	26.1 ²²	58.06 ¹	29.4 ²⁵	51.63 ⁴	43.2 ¹⁰
Feb. 9.4	30.44 ⁶	34.1 ²¹	56.75 ⁵	27.9 ¹⁸	58.00 ⁶	31.6 ²²	51.60 ³	44.3 ¹¹
19.4	30.33 ¹¹	35.9 ¹⁸	56.66 ⁹	29.4 ¹⁵	57.89 ¹¹	33.5 ¹⁹	51.51 ⁹	45.4 ¹¹
Mar. 1.4	30.19 ¹⁴	37.3 ¹⁴	56.53 ¹³	30.6 ¹²	57.74 ¹⁵	35.1 ¹⁶	51.38 ¹³	46.3 ⁹
11.3	30.02 ¹⁷	38.4 ¹¹	56.38 ¹⁵	31.4 ⁸	57.57 ¹⁷	36.3 ¹²	51.21 ¹⁷	47.0 ⁷
21.3	29.83 ¹⁹	39.1 ⁷	56.21 ¹⁷	32.0 ⁶	57.38 ¹⁹	37.1 ⁸	51.01 ²⁰	47.6 ⁶
31.3	29.63 ²⁰	39.4 ³	56.02 ¹⁹	32.2 ²	57.17 ²¹	37.5 ⁴	50.80 ²¹	47.9 ³
Apr. 10.2	29.44 ¹⁰	39.4 ⁰	55.84 ¹⁸	32.1 ¹	56.97 ²⁰	37.5 ⁰	50.59 ²¹	48.0 ¹
20.2	29.25 ¹⁹	39.0 ⁴	55.68 ¹⁶	31.8 ³	56.78 ¹⁹	37.1 ⁴	50.39 ²⁰	47.9 ¹
30.2	29.09 ¹⁶	38.2 ⁸	55.53 ¹⁵	31.1 ⁷	56.60 ¹⁸	36.3 ⁸	50.22 ¹⁷	47.6 ³
May 10.2	28.95 ¹⁴	37.1 ¹¹	55.40 ¹³	30.1 ¹⁰	56.45 ¹⁵	35.2 ¹¹	50.08 ¹⁴	47.1 ⁵
20.1	28.84 ¹¹	35.7 ¹⁴	55.31 ⁹	28.9 ¹²	56.34 ¹¹	33.8 ¹⁴	49.98 ¹⁰	46.3 ⁸
30.1	28.76 ⁸	34.0 ¹⁷	55.25 ⁶	27.5 ¹⁴	56.25 ⁹	32.1 ¹⁷	49.92 ⁶	45.4 ⁹
June 9.1	28.73 ³	32.1 ¹⁹	55.23 ²	25.9 ¹⁶	56.21 ⁴	30.1 ²⁰	49.91 ¹	44.5 ⁹
19.1	28.74 ¹	30.0 ²¹	55.25 ²	24.1 ¹⁸	56.21 ⁰	27.9 ²²	49.95 ⁴	43.4 ¹¹
29.0	28.78 ⁴	27.8 ²²	55.30 ⁵	22.2 ¹⁹	56.24 ³	25.6 ²³	50.04 ⁹	42.3 ¹¹
July 9.0	28.87 ⁹	25.5 ²³	55.39 ⁹	20.3 ¹⁹	56.32 ⁸	23.3 ²³	50.18 ¹⁴	41.1 ¹²
19.0	28.99 ¹²	23.2 ²³	55.52 ¹³	18.4 ¹⁹	56.43 ¹¹	20.9 ²⁴	50.35 ¹⁷	39.9 ¹²
Aug. 7.9	28.9	21.0 ²²	55.68 ¹⁶	16.5 ¹⁹	56.43 ¹⁵	18.6 ²³	50.57 ²²	38.8 ¹¹
17.9	29.14 ¹⁵	18.9 ²¹	55.87 ¹⁹	14.8 ¹⁷	56.58 ¹⁸	16.4 ²²	50.82 ²⁵	37.7 ¹¹
27.9	29.33 ¹⁹	17.0 ¹⁹	56.08 ²¹	13.3 ¹⁵	56.76 ²¹	14.5 ¹⁹	51.11 ²⁹	36.6 ¹¹
Sept. 6.8	29.54 ²¹	15.5 ¹⁵	56.31 ²³	12.0 ¹³	56.97 ²¹	12.9 ¹⁶	51.42 ³¹	35.6 ¹⁰
16.8	29.78 ²⁴	14.4 ¹¹	56.31 ²⁶	11.1 ⁹	57.21 ²⁴	11.3 ¹³	51.42 ³³	35.6 ¹⁰
Oct. 6.8	30.04 ²⁸	14.4 ⁸	56.57 ²⁷	11.1 ⁶	57.47 ²⁸	11.6 ⁸	51.75 ³⁶	34.6 ⁹
16.7	30.32 ³⁰	13.6 ³	56.84 ²⁹	10.5 ¹	57.75 ³⁰	10.8 ⁴	52.11 ³⁷	33.7 ⁸
Nov. 5.7	30.62 ³¹	13.3 ³	57.13 ³⁰	10.4 ¹	58.05 ³¹	10.4 ²	52.48 ³⁹	32.9 ⁷
15.6	30.93 ³¹	13.6 ³	57.43 ³¹	10.7 ³	58.36 ³¹	10.6 ⁷	52.87 ³⁹	32.2 ⁶
Dec. 5.6	31.24 ³¹	14.3 ⁷	57.74 ³¹	11.4 ⁷	58.68 ³²	11.3 ¹²	53.26 ³⁹	31.6 ⁵
15.6	31.55 ³¹	15.5 ¹⁷	58.04 ³⁰	12.6 ¹⁵	59.00 ³¹	12.5 ¹⁷	53.65 ⁴⁰	31.1 ⁴
25.6	31.86 ²⁰	17.2 ²⁰	58.34 ²⁰	14.1 ¹⁹	59.31 ³⁰	14.2 ²¹	54.05 ³⁸	30.7 ¹
35.5	32.15 ²⁷	19.2 ²⁴	58.63 ²⁷	16.0 ²⁵	59.61 ²⁸	16.3 ²⁹	54.43 ³⁶	30.6 ⁰
Mean Place	32.42 ²⁵	21.6 ²⁸	58.90 ²⁴	18.1 ²¹	59.89 ²⁵	18.7 ²⁸	54.79 ³³	30.6 ²
	32.67 ²¹	24.3 ²⁸	59.14 ²¹	20.5 ²⁵	60.14 ²¹	21.5 ²⁹	55.12 ³⁰	30.8 ⁴
	32.88 ¹⁶	27.1 ²⁰	59.35 ¹⁸	23.0 ²⁵	60.35 ¹⁷	24.4 ²⁹	55.42 ²⁵	31.2 ⁶
	33.04 ¹²	30.0 ²⁸	59.53 ¹²	25.5 ²⁵	60.52 ¹³	27.3 ³⁰	55.67 ¹⁹	31.8 ⁸
	33.16	32.8	59.65	28.0	60.65	30.3	55.86	32.6
Sec δ , Tan δ	1.002	-0.439	1.038	-0.277	1.115	-0.493	1.295	+0.823
Mean Place	28°.510	30''.00	54°.790	24''.90	56°.055	27''.17	48°.725	37''.06
D' ψ α , D ω α	-0.01	-0.01	-0.01	0.00	-0.01	-0.01	+0.02	+0.02
D' ψ δ , D ω δ	-0.1	+1.0	-0.1	+1.0	-0.1	+1.0	-0.1	+1.0

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	51 Geminorum. Mag. 5.3		γ^2 Volantis. Mag. 3.9		λ Geminorum. Mag. 3.6		25 H. Camelopardalis. Mag. 5.1	
	Right Ascension.	Declination N.	Right Ascension.	Declination S.	Right Ascension.	Declination N.	Right Ascension.	Declination N.
	h m 7 8	° ' " +16 18	h m 7 9	° ' " -70 21	h m 7 13	° ' " +16 41	h m 7 13	° ' " +82 34
Jan. 0.5	31.59	18.7 6	31.79	31.6 38	14.64	44.0 5	30.54	45.2 30
10.5	31.73 ¹⁴	18.1 4	31.79 ⁰	35.4 37	14.79 ¹⁵	43.5 4	31.11 ⁵⁷	48.2 30
20.5	31.81 ⁸	17.7 3	31.65 ¹⁴	39.1 37	14.88 ⁹	43.1 3	31.33 ²²	51.2 30
30.4	31.85 ⁴	17.4 2	31.39 ²⁶	42.6 35	14.91 ³	42.8 2	31.20 ¹³	54.1 29
Feb. 9.4	31.83 ²	17.2 1	31.02 ³⁷	45.8 28	14.90 ¹	42.6 0	30.74 ⁴⁶	56.9 28
19.4	31.76 ⁷	17.1 1	30.55 ⁴⁷	48.6 28	14.84 ⁶	42.6 0	29.97 ⁷⁷	59.5 26
Mar. 1.4	31.66 ¹⁰	17.2 1	30.00 ⁵⁵	51.0 24	14.74 ¹⁰	42.6 0	28.93 ¹⁰⁴	61.7 22
11.3	31.53 ¹³	17.2 0	29.38 ⁶²	52.9 19	14.61 ¹³	42.7 1	27.67 ¹²⁶	63.4 17
21.3	31.37 ¹⁶	17.3 2	28.72 ⁶⁶	54.3 14	14.45 ¹⁶	42.9 1	26.25 ¹⁴²	64.6 12
31.3	31.21 ¹⁷	17.5 1	28.03 ⁶⁹	55.2 3	14.29 ¹⁷	43.0 1	24.74 ¹⁵¹	65.2 6
Apr. 10.2	31.04 ¹⁵	17.6 1	27.34 ⁶⁸	55.5 2	14.12 ¹⁵	43.1 2	23.21 ¹⁴⁹	65.2 5
20.2	30.89 ¹⁴	17.7 2	26.66 ⁶⁵	55.3 7	13.97 ¹⁴	43.3 1	21.72 ¹³⁸	64.7 11
30.2	30.75 ¹¹	17.9 1	26.01 ⁶⁰	54.6 12	13.83 ¹¹	43.4 2	20.34 ¹²³	63.6 16
May 10.2	30.64 ⁸	18.0 2	25.41 ⁵³	53.4 17	13.72 ⁸	43.6 1	19.11 ¹⁰³	62.0 21
20.1	30.56 ⁴	18.2 1	24.88 ⁴⁶	51.7 21	13.64 ⁵	43.7 1	18.08 ⁷⁹	59.9 24
30.1	30.52 ⁰	18.3 2	24.42 ³⁸	49.6 25	13.59 ⁰	43.8 2	17.29 ⁵³	57.5 27
June 9.1	30.52 ⁴	18.5 1	24.04 ²⁸	47.1 28	13.59 ³	44.0 1	16.76 ²⁵	54.8 29
19.1	30.56 ⁷	18.6 2	23.76 ¹⁸	44.3 30	13.62 ⁷	44.1 2	16.51 ³	51.9 31
29.0	30.63 ¹¹	18.8 2	23.58 ⁷	41.3 32	13.69 ¹⁰	44.3 1	16.54 ³²	48.8 31
July 9.0	30.74 ¹⁴	19.0 2	23.51 ⁴	38.1 32	13.79 ¹⁴	44.4 2	16.86 ⁵⁹	45.7 31
19.0	30.88 ¹⁸	19.2 2	23.55 ¹⁵	34.9 32	13.93 ¹⁸	44.6 1	17.45 ⁸⁶	42.6 31
28.9	31.06 ²⁰	19.4 1	23.70 ²⁵	31.7 30	14.11 ²⁰	44.7 0	18.31 ¹¹⁰	39.5 28
Aug. 7.9	31.26 ²³	19.5 0	23.95 ³⁶	28.7 28	14.31 ²²	44.7 1	19.41 ¹³³	36.7 27
17.9	31.49 ²⁵	19.5 2	24.31 ⁴⁴	25.9 25	14.53 ²⁵	44.7 2	20.74 ¹⁵²	34.0 24
27.9	31.74 ²⁷	19.5 2	24.75 ⁵³	23.4 20	14.78 ²⁷	44.6 2	22.26 ¹⁷⁰	31.6 21
Sept. 6.8	32.01 ²⁹	19.3 3	25.28 ⁵⁹	21.4 15	15.05 ²⁸	44.4 3	23.96 ¹⁸⁴	29.5 17
16.8	32.30 ³⁰	19.0 5	25.87 ⁶⁵	19.9 9	15.33 ³⁰	44.1 5	25.80 ¹⁹⁵	27.8 14
26.8	32.60 ³¹	18.5 6	26.52 ⁶⁸	19.0 3	15.63 ³¹	43.6 6	27.75 ²⁰³	26.4 9
Oct. 6.8	32.91 ³²	17.9 7	27.20 ⁶⁹	18.7 4	15.94 ³²	43.0 8	29.78 ²⁰⁶	25.5 5
16.7	33.23 ³³	17.2 8	27.89 ⁶⁸	19.1 11	16.26 ³³	42.2 8	31.84 ²⁰⁶	25.0 0
26.7	33.56 ³²	16.4 9	28.57 ⁶⁵	20.2 17	16.59 ³²	41.4 10	33.90 ²⁰²	25.0 5
Nov. 5.7	33.88 ³¹	15.5 10	29.22 ⁶⁰	21.9 23	16.91 ³²	40.4 10	35.92 ¹⁹²	25.5 10
15.6	34.19 ³⁰	14.5 10	29.82 ⁵²	24.2 28	17.23 ³⁰	39.4 10	37.84 ¹⁷⁸	26.5 14
25.6	34.49 ²⁸	13.5 9	30.34 ⁴³	27.0 35	17.53 ²⁵	38.4 9	39.62 ¹⁵⁹	27.9 23
Dec. 5.6	34.77 ²⁴	12.5 8	30.77 ³²	30.3 37	17.81 ²¹	37.4 8	41.21 ¹³⁵	29.8 26
15.6	35.01 ²¹	11.6 8	31.09 ²¹	33.8 39	18.06 ¹⁷	36.5 7	42.56 ¹⁰⁸	32.1 28
25.5	35.22 ¹⁶	10.8 7	31.30 ⁷	37.5 39	18.27 ¹⁷	35.7 7	43.64 ⁷⁷	34.7 26
35.5	35.38 ¹⁶	10.1 7	31.37 ⁷	41.4 39	18.44 ¹⁷	35.0 7	44.41 ⁷⁷	37.5 26
Sec δ , Tan δ	1.042	+0.292	2.975	-2.802	1.044	+0.300	7.743	+7.678
Mean Place	29°.521	14''.88	28°.283	39''.88	12°.571	40''.50	16°.654	42''.85
$D^* \alpha$, $D_{\alpha} \alpha$	+0.01	+0.01	-0.07	-0.06	+0.01	+0.01	+0.19	+0.16
$D^* \delta$, $D_{\delta} \delta$	-0.1	+1.0	-0.1	+1.0	-0.1	+0.9	-0.1	+0.9

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	π Argus. Mag. 2.7		δ Geminorum. Mag. 3.5		δ Volantis. Mag. 4.0		ϵ Geminorum. Mag. 3.9	
	Right Ascension.	Declination S.	Right Ascension.	Declination N.	Right Ascension.	Declination S.	Right Ascension.	Declination N.
	h m 7 14	° ' " -36 56	h m 7 15	° ' " +22 8	h m 7 16	° ' " -67 47	h m 7 20	° ' " +27 57
Jan. 0.5	10.39	33.4	5.07	26.5	56.15	57.6	29.26	67.3
10.5	10.48 9	36.8 34	5.22 15	26.3 2	56.18 3	61.4 38	29.42 16	67.5 2
20.5	10.52 4	39.9 31	5.32 10	26.2 1	56.09 9	65.1 37	29.52 10	67.7 2
30.4	10.49 3	42.9 30	5.36 4	26.2 0	55.89 20	68.7 36	29.57 5	68.1 4
Feb. 9.4	10.41 13	45.6 27	5.35 6	26.4 2	55.59 39	71.9 29	29.57 6	68.6 5
19.4	10.28	47.9	5.29	26.6	55.20	74.8	29.51	69.1
Mar. 1.4	10.11 17	49.9 20	5.19 10	26.9 3	54.73 47	77.3 25	29.41 10	69.6 5
11.3	9.91 20	51.4 15	5.05 14	27.1 2	54.20 53	79.3 20	29.27 14	70.1 5
21.3	9.68 23	52.4 10	4.89 16	27.4 3	53.63 57	80.8 15	29.10 17	70.5 4
31.3	9.44 24	53.0 6	4.72 17	27.6 2	53.03 60	81.8 10	28.92 18	70.9 2
Apr. 10.3	9.20	53.2	4.55	27.8	52.43	82.2	28.74	71.1
20.2	8.97 23	52.9 3	4.39 16	27.9 1	51.84 59	82.1 1	28.57 17	71.2 1
30.2	8.76 21	52.2 7	4.25 14	28.0 1	51.27 57	81.5 6	28.42 15	71.1 1
May 10.2	8.57 19	51.0 12	4.14 11	28.0 0	50.74 53	80.4 11	28.30 12	71.0 1
20.1	8.42 15	49.5 15	4.05 9	27.9 1	50.27 47	78.8 16	28.21 9	70.7 3
30.1	8.30 12	47.6 19	4.01 4	27.8 1	49.86 41	76.7 21	28.15 6	70.4 3
June 9.1	8.22 8	45.4 22	4.00 1	27.7 1	49.53 33	74.3 24	28.14 1	70.0 4
19.1	8.18 4	43.0 24	4.03 3	27.5 2	49.28 25	71.6 27	28.16 2	69.5 5
29.0	8.19 1	40.4 26	4.10 7	27.4 1	49.12 16	68.6 30	28.23 7	69.0 5
July 9.0	8.24 5	37.7 27	4.21 11	27.2 2	49.06 6	65.5 31	28.34 11	68.5 5
19.0	8.34 13	35.0 27	4.35 17	27.0 2	49.09 13	62.2 33	28.48 18	68.0 6
29.0	8.47 17	32.3 27	4.52 21	26.8 2	49.22 22	59.0 32	28.66 28	67.4 6
Aug. 7.9	8.64 17	29.8 25	4.73 21	26.6 2	49.44 31	56.0 30	28.87 21	66.8 6
17.9	8.85 21	27.5 23	4.96 23	26.3 3	49.75 32	53.2 28	29.11 24	66.2 6
27.9	9.10 25	25.5 20	5.22 26	25.9 4	50.14 39	50.7 25	29.37 26	65.5 7
Sept. 6.8	9.37 27	24.0 15	5.50 28	25.5 4	50.60 46	48.6 21	29.66 29	64.8 7
16.8	9.67 30	22.9 11	5.79 29	25.0 5	51.13 53	47.1 15	29.96 30	64.1 7
26.8	9.99 32	22.3 6	6.10 31	24.4 6	51.71 58	46.1 10	30.28 32	63.4 7
Oct. 6.8	10.32 33	22.3 0	6.42 32	23.7 7	52.32 61	45.8 3	30.62 34	62.6 8
16.7	10.66 34	22.9 6	6.75 33	22.9 8	52.94 62	46.1 10	30.97 35	61.8 8
26.7	11.00 34	24.0 11	7.09 34	22.1 8	53.56 62	47.1 10	31.32 35	61.0 8
Nov. 5.7	11.34 34	25.8 18	7.42 33	21.3 8	54.16 60	48.7 16	31.67 35	60.2 8
15.7	11.66 32	28.0 22	7.75 33	20.4 9	54.72 56	51.0 23	32.01 34	59.5 7
25.6	11.96 30	30.6 26	8.06 31	19.6 8	55.21 49	53.7 27	32.34 33	58.9 6
Dec. 5.6	12.23 27	33.6 30	8.35 29	18.9 7	55.62 41	56.9 32	32.65 31	58.4 5
15.6	12.46 23	36.8 32	8.62 27	18.3 6	55.94 22	60.5 36	32.93 28	58.1 5
25.5	12.64 18	40.1 33	8.84 22	17.9 4	56.16 10	64.2 37	33.16 23	57.9 2
35.5	12.77 13	43.5 34	9.02 18	17.5 4	56.26 10	68.0 38	33.35 19	57.9 0
Sec δ , Tan δ	1.251	-0.752	1.080	+0.407	2.647	-2.451	1.132	+0.531
Mean Place	8°.442	40''.18	2°.913	23''.28	52°.998	66''.13	26°.978	64''.77
$D\psi a, D_{\omega} a$	-0.02	-0.02	+0.01	+0.01	-0.06	-0.05	+0.01	+0.01
$D\psi \delta, D_{\omega} \delta$	-0.1	+0.9	-0.1	+0.9	-0.1	+0.9	-0.1	+0.9

FOR THE UPPER TRANSIT AT WASHINGTON.

n Solar Date.	η Canis Majoris. Mag. 2.4		Groombridge 1308. Mag. 5.8		β Canis Minoris. Mag. 3.1		ρ Geminorum. Mag. 4.2	
	Right Ascension.	Declination S.	Right Ascension.	Declination N.	Right Ascension.	Declination N.	Right Ascension.	Declination N.
	h m 7 20	° ' -29 7	h m 7 22	° ' +68 38	h m 7 22	° ' + 8 27	h m 7 23	° ' +31 57
	s "	"	s "	"	s "	"	s "	"
n. 0.5	45.89	65.4	8.20	28.3	34.50	44.8	41.16	19.1
10.5	46.00	68.5	8.49	30.7	34.64	43.7	41.34	19.4
20.5	46.05	71.4	8.65	33.2	34.74	42.7	41.45	19.9
30.4	46.05	74.1	8.68	35.7	34.78	41.9	41.50	20.6
b. 9.4	46.00	76.6	8.59	38.1	34.77	41.3	41.50	21.3
19.4	45.90	78.7	8.38	40.4	34.72	40.8	41.44	22.0
ir. 1.4	45.76	80.5	8.07	42.4	34.63	40.5	41.34	22.7
11.3	45.58	81.8	7.68	44.0	34.50	40.4	41.19	23.4
21.3	45.39	82.8	7.22	45.1	34.35	40.3	41.02	23.9
31.3	45.18	83.4	6.73	45.8	34.19	40.3	40.84	24.3
r. 10.3	44.97	83.5	6.24	46.0	34.03	40.5	40.65	24.5
20.2	44.77	83.3	5.75	45.8	33.88	40.7	40.47	24.6
30.2	44.58	82.6	5.30	45.0	33.75	41.0	40.31	24.5
y 10.2	44.42	81.6	4.90	43.8	33.63	41.3	40.18	24.3
20.1	44.29	80.3	4.58	42.2	33.55	41.7	40.08	23.9
30.1	44.19	78.6	4.34	40.3	33.50	42.2	40.02	23.4
ne 9.1	44.13	76.6	4.20	38.1	33.48	42.7	40.00	22.8
19.1	44.11	74.5	4.16	35.7	33.50	43.3	40.03	22.2
29.0	44.12	72.2	4.21	33.1	33.56	43.9	40.09	21.5
ly 9.0	44.18	69.7	4.36	30.5	33.65	44.5	40.20	20.7
19.0	44.27	67.3	4.61	27.8	33.77	45.1	40.35	19.9
29.0	44.40	64.9	4.95	25.2	33.92	45.6	40.53	19.1
ig. 7.9	44.57	62.6	5.37	22.6	34.10	46.1	40.74	18.3
17.9	44.77	60.6	5.87	20.3	34.31	46.5	40.99	17.5
27.9	45.00	58.8	6.44	18.1	34.54	46.7	41.26	16.6
pt. 6.8	45.25	57.4	7.07	16.1	34.79	46.8	41.55	15.8
16.8	45.53	56.5	7.75	14.4	35.06	46.6	41.87	14.9
26.8	45.83	56.0	8.47	13.0	35.35	46.3	42.20	14.1
t. 6.8	46.14	56.1	9.22	12.0	35.65	45.7	42.55	13.2
16.7	46.46	56.7	9.99	11.3	35.96	44.9	42.91	12.4
26.7	46.79	57.8	10.77	11.0	36.27	43.9	43.27	11.6
iv. 5.7	47.11	59.4	11.54	11.0	36.58	42.8	43.63	10.9
15.7	47.42	61.5	12.28	11.5	36.89	41.5	43.99	10.3
25.6	47.71	64.0	12.98	12.5	37.19	40.1	44.34	9.9
c. 5.6	47.98	66.7	13.62	13.8	37.46	38.7	44.66	9.6
15.6	48.21	69.7	14.19	15.4	37.71	37.3	44.95	9.4
25.5	48.40	72.8	14.66	17.4	37.92	36.0	45.20	9.5
35.5	48.54	75.9	15.02	19.7	38.09	34.8	45.40	9.7
δ , Tan δ	1.145	-0.557	2.746	+2.557	1.011	+0.149	1.179	+0.624
n Place	44°.023	71''.78	2°.963	27''.05	32°.538	41''.16	38°.789	16''.89
a , $D_{\omega} a$	-0.01	-0.01	+0.06	+0.06	0.00	0.00	+0.02	+0.01
δ , $D_{\omega} \delta$	-0.1	+0.9	-0.1	+0.9	-0.1	+0.9	-0.1	+0.9

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	σ Argus. Mag. 3.3		α^2 Geminorum. (Castor.) Mag. 2.0		β Monocerotis. Mag. 5.2		α Canis Minoris. (Procyon.) Mag. 0.5	
	Right Ascension.	Declination S.	Right Ascension.	Declination N.	Right Ascension.	Declination S.	Right Ascension.	Declination N.
	h m	° '	h m	° '	h m	° '	h m	° '
	7 26	-43 7	7 29	+32 4	7 33	- 3 55	7 34	+ 5 26
	s	"	s	"	s	"	s	"
Jan. 0.5	33.99	36.1	13.11	36.2	4.95	8.9	53.05	39.7
10.5	34.09 ¹⁰	39.7 ³⁶	13.29 ¹⁸	36.5 ³	5.09 ¹⁴	10.8 ¹⁹	53.20 ¹⁵	38.3 ¹⁴
20.5	34.13 ⁴	43.1 ³⁴	13.41 ¹²	37.0 ⁵	5.19 ¹⁰	12.5 ¹⁷	53.30 ¹⁰	37.1 ¹²
30.5	34.11 ²	46.3 ³²	13.47 ⁶	37.7 ⁷	5.23 ⁴	14.0 ¹⁵	53.35 ⁵	36.1 ⁸
Feb. 9.4	34.02 ⁹	49.3 ³⁰	13.47 ⁰	38.4 ⁷	5.22 ¹	15.3 ¹³	53.34 ¹	35.3 ¹⁰
	14	25	6	7	5	11	4	6
19.4	33.88	51.8	13.41	39.1	5.17	16.4	53.30	34.7
Mar. 1.4	33.70 ¹⁸	54.0 ²²	13.31 ¹⁰	39.9 ⁸	5.08 ⁹	17.3 ⁹	53.21 ⁹	34.2 ⁵
11.3	33.47 ²³	55.8 ¹⁸	13.17 ¹⁴	40.5 ⁶	4.96 ¹²	17.9 ⁶	53.09 ¹²	33.9 ³
21.3	33.22 ²⁵	57.1 ¹³	13.00 ¹⁷	41.1 ⁶	4.81 ¹⁵	18.3 ⁴	52.94 ¹⁵	33.7 ²
31.3	32.96 ²⁶	58.0 ⁹	12.82 ¹⁸	41.5 ⁴	4.65 ¹⁶	18.5 ²	52.79 ¹⁵	33.7 ⁶
	27	3	18	3	16	0	16	1
Apr. 10.3	32.69	58.3	12.64	41.8	4.49	18.5	52.63	33.8
20.2	32.43 ²⁶	58.2 ¹	12.46 ¹⁸	41.9 ¹	4.33 ¹⁶	18.3	52.47 ¹⁶	34.0 ²
30.2	32.18 ²⁵	57.6 ⁶	12.29 ¹⁷	41.8 ¹	4.19 ¹⁴	17.9 ⁴	52.33 ¹⁴	34.3 ³
May 10.2	31.96 ²²	56.5 ¹¹	12.15 ¹⁴	41.6 ²	4.07 ¹²	17.3 ⁶	52.22 ¹¹	34.7 ⁴
20.2	31.77 ¹⁹	55.0 ¹⁵	12.05 ¹⁰	41.3 ³	3.97 ¹⁰	16.6 ⁷	52.13 ⁹	35.2 ⁵
	16	18	6	5	6	9	6	5
30.1	31.61	53.2	11.99	40.8	3.91	15.7	52.07	35.7
June 9.1	31.50 ¹¹	51.0 ²²	11.96 ³	40.2 ⁶	3.88 ³	14.6 ¹¹	52.04 ³	36.3 ⁶
19.1	31.43 ⁷	48.5 ²⁵	11.98 ²	39.5 ⁷	3.88 ⁰	13.5 ¹¹	52.05 ¹	37.0 ⁷
29.0	31.41 ²	45.8 ²⁷	12.04 ⁶	38.8 ⁷	3.92 ⁴	12.3 ¹²	52.09 ⁴	37.7 ⁸
July 9.0	31.43 ²	43.0 ²⁸	12.14 ¹⁰	38.0 ⁸	3.99 ⁷	11.0 ¹³	52.17 ⁸	38.5 ⁷
	8	29	13	8	10	12	12	7
19.0	31.51	40.1	12.27	37.2	4.09	9.8	52.29	39.2
29.0	31.63 ¹²	37.3 ²⁸	12.45 ¹⁸	36.4 ⁸	4.23 ¹⁴	8.6 ¹²	52.43 ¹⁴	39.8 ⁶
Aug. 7.9	31.79 ¹⁶	34.6 ²⁷	12.66 ²¹	35.5 ⁹	4.39 ¹⁶	7.5 ¹¹	52.60 ¹⁷	40.4 ⁶
17.9	31.99 ²⁰	32.1 ²⁵	12.90 ²⁴	34.6 ⁹	4.58 ¹⁹	6.5 ¹⁰	52.79 ¹⁹	40.8 ⁴
27.9	32.23 ²⁴	29.9 ²²	13.16 ²⁶	33.7 ⁹	4.79 ²¹	5.7 ⁸	53.01 ²²	41.1 ³
	28	18	29	9	24	5	24	1
Sept. 6.9	32.51	28.1	13.45	32.8	5.03	5.2	53.25	41.2
16.8	32.82 ³¹	26.8 ¹³	13.76 ³¹	31.9 ⁹	5.29 ²⁶	5.0 ²	53.51 ²⁶	41.1 ¹
26.8	33.15 ³³	26.0 ⁸	14.09 ³³	31.0 ⁹	5.56 ²⁷	5.0 ⁰	53.79 ²⁸	40.7 ⁴
Oct. 6.8	33.50 ³⁵	25.9 ¹	14.44 ³⁵	30.1 ⁹	5.85 ²⁹	5.4 ⁴	54.08 ²⁹	40.1 ⁶
16.7	33.87 ³⁷	26.3 ⁴	14.80 ³⁶	29.2 ⁹	6.15 ³⁰	6.2 ⁸	54.39 ³¹	39.3 ⁸
	37	10	36	8	30	10	31	11
26.7	34.24	27.3	15.16	28.4	6.45	7.2	54.70	38.2
Nov. 5.7	34.60 ³⁶	28.9 ¹⁶	15.53 ³⁷	27.6 ⁸	6.76 ³¹	8.6 ¹⁴	55.01 ³¹	36.9 ¹³
15.7	34.95 ³⁵	31.1 ²²	15.89 ³⁶	26.9 ⁷	7.07 ³¹	10.2 ¹⁶	55.31 ³⁰	35.5 ¹⁴
25.6	35.28 ³³	33.8 ²⁷	16.24 ³⁵	26.4 ⁵	7.36 ²⁹	12.0 ¹⁸	55.61 ³⁰	33.9 ¹⁶
Dec. 5.6	35.57 ²⁹	36.8 ³⁰	16.56 ³²	26.1 ³	7.63 ²⁷	14.0 ²⁰	55.89 ²⁸	32.3 ¹⁶
	25	33	30	2	24	20	25	16
15.6	35.82	40.1	16.86	25.9	7.87	16.0	56.14	30.7
25.6	36.01 ¹⁹	43.6 ³⁵	17.11 ²⁵	25.9 ⁰	8.08 ²¹	18.0 ²⁰	56.35 ²¹	29.1 ¹⁶
35.5	36.15 ¹⁴	47.2 ³⁶	17.32 ²¹	26.1 ²	8.25 ¹⁷	20.0 ²⁰	56.53 ¹⁸	27.7 ¹⁴
Sec δ , Tan δ	1.370	-0.937	1.180	+0.627	1.002	-0.069	1.005	+0.095
Mean Place	31 ^s .996	43 ["] .66	10 ^s .736	34 ["] .45	3 ^s .100	13 ["] .16	51 ^s .192	36 ["] .57
D ['] ψ α , D ₀ α	-0.02	-0.02	+0.02	+0.02	0.00	0.00	0.00	0.00
D ['] δ , D ₀ δ	-0.1	+0.9	-0.1	+0.9	-0.1	+0.9	-0.1	+0.9

FOR THE UPPER TRANSIT AT WASHINGTON.

an Solar Date.	24 Lyncis. Mag. 5.0		κ Geminorum. Mag. 3.7		β Geminorum. (Pollux.) Mag. 1.2		4 Puppis. Mag. 5.1	
	Right Ascension.	Declination N.	Right Ascension.	Declination N.	Right Ascension.	Declination N.	Right Ascension.	Declination S.
	h m 7 35	° ' " +58 54	h m 7 39	° ' " +24 36	h m 7 40	° ' " +28 13	h m 7 42	° ' " -14 21
n. 0.5	53.19 ^s	37.9 ^s	21.31 ^s	11.2 ^s	9.29 ^s	57.9 ^s	3.83 ^s	18.2 ^s
10.5	53.45 ²⁶	39.7 ¹⁸	21.49 ¹⁸	11.1 ¹	9.47 ¹⁸	58.0 ¹	3.97 ¹⁴	20.6 ²⁴
20.5	53.61 ¹⁶	41.7 ²⁰	21.61 ¹²	11.1 ⁰	9.60 ¹³	58.2 ²	4.06 ⁹	23.0 ²⁴
30.5	53.69 ⁸	43.8 ²¹	21.68 ⁷	11.2 ¹	9.67 ⁷	58.6 ⁴	4.11 ⁵	25.1 ²¹
b. 9.4	53.67 ²	45.9 ²¹	21.69 ¹	11.5 ³	9.68 ¹	59.1 ⁵	4.10 ¹	27.0 ¹⁹
19.4	53.56 ¹¹	47.9 ²⁰	21.65 ⁴	11.9 ⁴	9.63 ⁵	59.7 ⁶	4.04 ⁶	28.6 ¹⁶
11.4	53.38 ¹⁸	49.7 ¹⁸	21.57 ⁸	12.3 ⁴	9.55 ⁸	60.3 ⁶	3.95 ⁹	29.9 ¹³
11.4	53.13 ²⁵	51.2 ¹⁵	21.45 ¹²	12.7 ⁴	9.42 ¹³	60.8 ⁵	3.82 ¹³	31.0 ¹¹
21.3	52.83 ³⁰	52.4 ¹²	21.30 ¹⁵	13.2 ⁵	9.26 ¹⁶	61.4 ⁶	3.67 ¹⁵	31.7 ⁷
31.3	52.51 ³²	53.2 ⁸	21.13 ¹⁷	13.5 ³	9.09 ¹⁷	61.8 ⁴	3.50 ¹⁷	32.2 ⁵
10.3	52.17 ³⁴	53.6 ⁴	20.96 ¹⁷	13.8 ³	8.91 ¹⁸	62.1 ³	3.33 ¹⁷	32.3 ¹
20.2	51.85 ³²	53.6 ⁰	20.79 ¹⁷	14.0 ²	8.74 ¹⁷	62.3 ²	3.16 ¹⁷	32.2 ¹
30.2	51.54 ³¹	53.1 ⁵	20.64 ¹⁵	14.1 ¹	8.58 ¹⁶	62.4 ¹	3.01 ¹⁵	31.8 ⁴
10.2	51.27 ²⁷	52.3 ⁸	20.52 ¹²	14.1 ⁰	8.45 ¹³	62.3 ¹	2.87 ¹⁴	31.1 ⁷
20.2	51.06 ²¹	51.1 ¹²	20.42 ¹⁰	14.1 ⁰	8.34 ¹¹	62.1 ²	2.76 ¹¹	30.1 ¹⁰
30.1	50.89 ¹⁷	49.6 ¹⁵	20.35 ⁷	13.9 ²	8.27 ⁷	61.8 ³	2.68 ⁸	29.0 ¹¹
9.1	50.80 ⁹	47.9 ¹⁷	20.32 ³	13.7 ²	8.24 ³	61.4 ⁴	2.63 ⁵	27.6 ¹⁴
19.1	50.77 ³	45.9 ²⁰	20.33 ¹	13.4 ³	8.25 ¹	61.0 ⁴	2.62 ¹	26.1 ¹⁵
29.1	50.81 ⁴	43.8 ²¹	20.38 ⁵	13.1 ³	8.29 ⁴	60.4 ⁶	2.64 ²	24.4 ¹⁷
9.0	50.92 ¹¹	41.5 ²³	20.47 ⁹	12.7 ⁴	8.37 ⁸	59.9 ⁵	2.69 ⁵	22.7 ¹⁷
19.0	51.10 ¹⁸	39.3 ²²	20.59 ¹²	12.3 ⁴	8.50 ¹³	59.3 ⁶	2.78 ⁹	22.7 ¹⁸
29.0	51.34 ²⁴	37.0 ²³	20.74 ¹⁵	11.9 ⁴	8.65 ¹⁵	58.6 ⁷	2.90 ¹²	20.9 ¹⁷
7.9	51.63 ²⁹	34.7 ²³	20.93 ¹⁹	11.4 ⁵	8.84 ¹⁹	57.9 ⁷	3.05 ¹⁵	19.2 ¹⁷
17.9	51.98 ³⁵	32.6 ²¹	21.14 ²¹	10.8 ⁶	9.06 ²²	57.1 ⁸	3.22 ¹⁷	17.6 ¹⁶
27.9	52.38 ⁴⁰	30.6 ²⁰	21.38 ²⁴	10.2 ⁶	9.31 ²⁵	56.3 ⁸	3.43 ²¹	16.1 ¹⁵
6.9	52.82 ⁴⁴	28.7 ¹⁹	21.65 ²⁷	9.5 ⁷	9.58 ²⁷	55.5 ⁸	3.66 ²³	14.9 ¹²
16.8	53.30 ⁴⁸	27.0 ¹⁷	21.93 ²⁸	8.8 ⁷	9.87 ²⁹	54.6 ⁹	3.91 ²⁵	14.0 ⁹
26.8	53.81 ⁵¹	25.5 ¹⁵	22.23 ³⁰	7.9 ⁹	10.18 ³¹	53.7 ⁹	4.18 ²⁷	13.4 ⁶
6.8	54.34 ⁵³	24.3 ¹²	22.55 ³²	7.0 ⁹	10.51 ³³	52.8 ⁹	4.47 ²⁹	13.2 ²
16.8	54.90 ⁵⁶	23.3 ¹⁰	22.89 ³⁴	6.1 ⁹	10.86 ³⁵	51.8 ¹⁰	4.77 ³⁰	13.4 ²
26.7	55.46 ⁵⁶	22.7 ⁶	23.23 ³⁴	5.1 ¹⁰	11.21 ³⁵	50.8 ¹⁰	5.08 ³¹	14.0 ⁶
5.7	56.03 ⁵⁷	22.4 ³	23.57 ³⁴	4.1 ¹⁰	11.56 ³⁵	49.9 ⁹	5.39 ³¹	15.1 ¹¹
15.7	56.58 ⁵⁵	22.4 ⁰	23.92 ³⁵	3.2 ⁹	11.91 ³⁵	49.0 ⁹	5.70 ³¹	15.1 ¹⁴
25.6	57.11 ⁵³	22.8 ⁰	24.25 ³³	2.3 ⁹	12.25 ³⁴	48.3 ⁷	6.00 ³⁰	18.3 ¹⁸
5.6	57.61 ⁵⁰	23.6 ⁸	24.56 ³¹	1.5 ⁸	12.58 ³³	47.7 ⁶	6.27 ²⁷	20.4 ²¹
15.6	58.05 ⁴⁴	24.7 ¹¹	24.85 ²⁹	0.9 ⁶	12.87 ²⁹	47.2 ⁵	6.52 ²⁵	22.7 ²³
25.6	58.43 ³⁸	26.1 ¹⁴	25.10 ²⁵	0.4 ⁵	13.12 ²⁵	47.0 ²	6.73 ²¹	25.2 ²⁵
35.5	58.74 ³¹	27.8 ¹⁷	25.30 ²⁰	0.1 ³	13.33 ²¹	46.9 ¹	6.90 ¹⁷	27.8 ²⁶
δ, Tan δ	1.937	+1.658	1.100	+0.458	1.135	+0.537	1.032	-0.256
m Place	49°.392	37''.89	19°.122	9''.66	7°.018	56''.71	2°.035	23''.32
α, D _α α	+0.04	+0.04	+0.01	+0.01	+0.01	+0.02	-0.01	-0.01
δ, D _δ δ	-0.2	+0.9	-0.2	+0.9	-0.2	+0.9	-0.2	+0.9

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	ξ Argus. Mag. 3.5		ϕ Geminorum. Mag. 5.0		σ Lynce. Mag. 5.7		Groombridge Mag. 5
	Right Ascension.	Declination S.	Right Ascension.	Declination N.	Right Ascension.	Declination N.	Right Ascension.
	h m	° '	h m	° '	h m	° '	h m
	7 45	-24 38	7 48	+26 59	7 48	+47 46	7 50
	s	"	s	"	s	"	s
Jan. 0.5	44.95	38.5	20.11	13.2	34.73	68.9	9.63
10.5	45.09 ¹⁴	41.4 ²⁹	20.30 ¹⁹	13.2 ⁰	34.97 ²⁴	70.1 ¹²	10.08 ⁴⁵
20.5	45.18 ⁹	44.2 ²⁸	20.44 ¹⁴	13.3 ¹	35.13 ¹⁶	71.5 ¹⁴	10.36 ²⁸
30.5	45.21 ³	46.9 ²⁷	20.51 ⁷	13.6 ³	35.22 ⁹	73.0 ¹⁵	10.47 ¹¹
Feb. 9.4	45.19 ²	49.3 ²⁴	20.54 ³	14.0 ⁴	35.24 ²	74.6 ¹⁶	10.42 ⁵
	6	21	3	6	6	16	22
19.4	45.13	51.4 ⁻¹⁸	20.51 ⁸	14.6 ⁵	35.18 ¹¹	76.2 ¹⁴	10.20 ³⁶
Mar. 1.4	45.02 ¹¹	53.2 ¹⁴	20.43 ¹²	15.1 ⁶	35.07 ¹⁷	77.6 ¹³	9.84 ⁴⁹
11.4	44.88 ¹⁴	54.6 ¹⁰	20.31 ¹⁵	15.7 ⁵	34.90 ²¹	78.9 ¹¹	9.35 ⁵⁸
21.3	44.71 ¹⁷	55.6 ⁷	20.16 ¹⁶	16.2 ⁵	34.69 ²³	80.0 ⁸	8.77 ⁶⁵
31.3	44.52 ¹⁹	56.3 ³	20.00 ¹⁸	16.7 ³	34.46 ²⁴	80.8 ⁵	8.12 ⁶⁸
Apr. 10.3	44.33 ¹⁹	56.6 ⁰	19.82 ¹⁷	17.0 ²	34.22 ²⁴	81.3 ²	7.44 ⁶⁸
20.2	44.14 ¹⁷	56.6 ⁴	19.65 ¹⁵	17.2 ¹	33.98 ²²	81.5 ¹	6.76 ⁶⁵
30.2	43.97 ¹⁶	56.2 ⁸	19.50 ¹⁴	17.3 ¹	33.76 ²⁰	81.4 ⁵	6.11 ⁵⁹
May 10.2	43.81 ¹³	55.4 ¹¹	19.36 ¹¹	17.4 ²	33.56 ¹²	80.9 ⁷	5.52 ⁵²
20.2	43.68 ¹⁰	54.3 ¹⁴	19.25 ⁷	17.2 ²	33.40 ¹²	80.2 ¹¹	5.00 ⁴²
30.1	43.58	52.9 ¹⁶	19.18	17.0 ³	33.28	79.1 ¹²	4.58
June 9.1	43.51 ⁷	51.3 ¹⁹	19.14 ⁴	16.7 ⁴	33.21 ⁷	77.9 ¹⁴	4.27 ³¹
19.1	43.47 ⁰	49.4 ²⁰	19.14 ⁰	16.3 ⁵	33.19 ²	76.5 ¹⁵	4.09 ¹⁸
29.1	43.47 ⁴	47.4 ²²	19.18 ⁸	15.8 ⁵	33.23 ⁸	75.0 ¹⁷	4.04 ⁵
July 9.0	43.51 ⁸	45.2 ²²	19.26 ¹¹	15.3 ⁵	33.31 ¹³	73.3 ¹⁸	4.11 ⁷
19.0	43.59 ¹¹	43.0 ²²	19.37 ¹⁵	14.8 ⁶	33.44 ¹⁸	71.5 ¹⁸	4.31 ³²
29.0	43.70 ¹⁴	40.8 ²¹	19.52 ¹⁸	14.2 ⁷	33.62 ²³	69.7 ¹⁸	4.63 ⁴⁵
Aug. 7.9	43.84 ¹⁷	38.7 ¹⁹	19.70 ²¹	13.5 ⁷	33.85 ²⁶	67.9 ¹⁷	5.08 ⁵⁵
17.9	44.01 ²¹	36.8 ¹⁶	19.91 ²⁴	12.7 ⁷	34.11 ³⁰	66.2 ¹⁷	5.63 ⁶⁵
27.9	44.22 ²³	35.2 ¹³	20.15 ²⁶	12.0 ⁹	34.41 ³⁴	64.5 ¹⁷	6.28 ⁷⁵
Sept. 6.9	44.45 ²⁵	33.9 ¹⁰	20.41 ²⁹	11.1 ⁹	34.75 ³⁷	62.8 ¹⁶	7.03 ⁸²
16.8	44.70 ²⁸	32.9 ⁴	20.70 ³⁰	10.2 ⁹	35.12 ³⁹	61.2 ¹⁴	7.85 ⁸⁹
26.8	44.98 ³⁰	32.5 ⁰	21.00 ³²	9.3 ¹⁰	35.51 ⁴²	59.8 ¹³	8.74 ⁹⁴
Oct. 6.8	45.28 ³¹	32.5 ⁵	21.32 ³⁴	8.3 ¹¹	35.93 ⁴⁵	58.5 ¹¹	9.68 ⁹⁸
16.8	45.59 ³²	33.0 ¹⁰	21.66 ³⁵	7.2 ¹⁰	36.36 ⁴⁵	57.4 ⁹	10.66 ¹⁰¹
26.7	45.91 ³³	34.0 ¹⁵	22.01 ³⁵	6.2 ¹⁰	36.81 ⁴⁵	56.5 ⁷	11.67 ¹⁰⁰
Nov. 5.7	46.24 ³¹	35.5 ¹⁹	22.36 ³⁵	5.2 ¹⁰	37.26 ⁴⁵	55.8 ⁴	12.67 ⁹⁹
15.7	46.55 ³¹	37.4 ²³	22.71 ³⁴	4.2 ⁸	37.71 ⁴³	55.4 ²	13.66 ⁹⁵
25.6	46.86 ²⁸	39.7 ²⁶	23.05 ³³	3.4 ⁸	38.14 ⁴¹	55.2 ²	14.61 ⁸⁷
Dec. 5.6	47.14 ²⁵	42.3 ²⁸	23.38 ³⁰	2.6 ⁵	38.55 ³⁸	55.4 ⁵	15.48 ⁷⁹
15.6	47.39	45.1 ³⁰	23.68	2.1 ⁴	38.93	55.9 ⁷	16.27 ⁶⁷
25.6	47.61 ²²	48.1 ²⁹	23.94 ²¹	1.7 ²	39.26 ²⁷	56.6 ¹¹	16.94 ⁵³
35.5	47.78	51.0	24.15	1.5	39.53	57.7	17.47
Sec δ , Tan δ	1.100	-0.459	1.122	+0.509	1.488	+1.102	3.660
Mean Place	43°.165	44°'.72	17°.882	12°'.46	31°.771	69°'.69	2°.805
D ψ α , D ω α	-0.01	-0.01	+0.01	+0.02	+0.03	+0.03	+0.08
D ψ δ , D ω δ	-0.2	+0.9	-0.2	+0.9	-0.2	+0.9	-0.2

[Eph 13]

FOR THE UPPER TRANSIT AT WASHINGTON.

Solar date.	χ Argus. Mag. 3.6		ω Cancri. Mag. 5.9		χ Geminorum. Mag. 5.0		27 Lynxis. Mag. 4.9	
	Right Ascension.	Declina- tion S.	Right Ascension.	Declina- tion N.	Right Ascension.	Declina- tion N.	Right Ascension.	Declina- tion N.
	h m 7 54	" ' -52 44	h m 7 55	" ' +25 37	h m 7 58	" ' +28 1	h m 8 2	" ' +51 44
	s 39.18	" 65.4	s 49.60	" 35.3	s 20.30	" 60.5	s 7.52	" 67.9
0.6	39.18 ¹⁴	69.1 ³⁷	49.79 ¹⁹	35.1 ²	20.50 ²⁰	60.5 ⁰	7.78 ²⁶	69.3 ¹⁴
10.5	39.32 ⁶	72.9 ³⁸	49.93 ¹⁴	35.1 ⁰	20.65 ¹⁵	60.7 ²	7.97 ¹⁹	70.8 ¹⁵
20.5	39.38 ⁸	76.5 ³⁶	50.02 ⁹	35.3 ²	20.74 ⁹	61.0 ³	8.09 ¹²	72.5 ¹⁷
30.5	39.36 ²	79.8 ³¹	50.05 ³	35.7 ⁴	20.77 ³	61.5 ⁵	8.12 ³	74.3 ¹⁸
9.4	39.28 ¹⁵	82.9 ³³	50.02 ³	36.1 ⁴	20.75 ²	62.1 ⁶	8.08 ⁴	76.1 ¹⁸
19.4	39.13 ²¹	85.6 ²⁷	49.95 ⁷	36.6 ⁵	20.68 ⁷	62.7 ⁶	7.96 ¹²	77.8 ¹⁷
1.4	38.92 ²⁶	87.9 ²³	49.84 ¹¹	37.2 ⁶	20.56 ¹²	63.3 ⁶	7.79 ¹⁷	79.3 ¹⁵
11.4	38.66 ²⁹	89.7 ¹⁸	49.70 ¹⁴	37.7 ⁵	20.42 ¹⁴	63.9 ⁶	7.58 ²¹	80.6 ¹³
21.3	38.37 ³²	91.0 ¹³	49.54 ¹⁶	38.2 ⁵	20.26 ¹⁶	64.5 ⁶	7.33 ²⁵	81.6 ¹⁰
31.3	38.05 ³³	91.8 ⁸	49.37 ¹⁷	38.5 ³	20.08 ¹⁸	64.9 ⁴	7.06 ²⁷	82.3 ⁷
10.3	37.72 ³³	92.2 ⁴	49.20 ¹⁷	38.8 ³	19.91 ¹⁷	65.2 ³	6.80 ²⁶	82.6 ³
20.3	37.39 ³²	92.0 ²	49.05 ¹⁵	39.0 ²	19.75 ¹⁶	65.3 ¹	6.55 ²⁵	82.5 ¹
30.2	37.07 ³⁰	91.3 ⁷	48.91 ¹⁴	39.0 ⁰	19.61 ¹⁴	65.3 ⁰	6.32 ²³	82.1 ⁴
10.2	36.77 ²⁷	90.1 ¹²	48.80 ¹¹	39.0 ⁰	19.50 ¹¹	65.2 ¹	6.13 ¹⁹	81.3 ⁸
20.2	36.50 ²⁴	88.5 ¹⁶	48.72 ⁸	38.8 ²	19.42 ⁸	65.0 ²	5.98 ¹⁵	80.3 ¹⁰
30.1	36.26 ¹⁹	86.5 ²⁰	48.68 ⁴	38.6 ²	19.37 ⁵	64.7 ³	5.88 ¹⁰	78.9 ¹⁴
ne 9.1	36.07 ¹⁵	84.1 ²⁴	48.68 ⁰	38.3 ³	19.36 ¹	64.2 ⁵	5.84 ⁴	77.4 ¹⁵
19.1	35.92 ⁹	81.5 ²⁶	48.71 ³	37.9 ⁴	19.39 ³	63.7 ⁵	5.85 ¹	75.6 ¹⁸
29.1	35.83 ⁴	78.6 ²⁹	48.78 ⁷	37.4 ⁵	19.46 ⁷	63.1 ⁶	5.91 ⁶	73.8 ¹⁸
ly 9.0	35.79 ²	75.7 ²⁹	48.88 ¹⁰	36.9 ⁵	19.57 ¹¹	62.5 ⁶	6.03 ¹²	71.8 ²⁰
19.0	35.81 ⁷	72.7 ³⁰	49.02 ¹⁴	36.4 ⁵	19.71 ¹⁴	61.8 ⁷	6.20 ¹⁷	69.8 ²⁰
29.0	35.88 ¹³	69.7 ²⁸	49.19 ¹⁷	35.8 ⁶	19.87 ¹⁶	61.0 ⁸	6.42 ²²	67.7 ²¹
18.0	36.01 ¹⁸	66.9 ²⁵	49.39 ²⁰	35.1 ⁷	19.87 ²¹	60.1 ⁹	6.68 ²⁶	65.7 ²⁰
7.9	36.19 ²⁴	64.4 ²¹	49.62 ²³	34.3 ⁸	20.08 ²³	59.3 ⁸	6.99 ³¹	63.7 ²⁰
27.9	36.43 ²⁸	62.3 ¹⁷	49.87 ²⁸	33.5 ⁹	20.56 ²⁸	58.3 ¹⁰	7.33 ³⁸	61.7 ¹⁸
6.9	36.71 ³³	60.6 ¹²	50.15 ³⁰	32.6 ¹⁰	20.84 ³⁰	57.3 ¹¹	7.71 ⁴¹	59.9 ¹⁷
16.8	37.04 ³⁶	59.4 ⁶	50.45 ³¹	31.6 ¹⁰	21.14 ³²	56.2 ¹¹	8.12 ⁴¹	58.2 ¹⁷
26.8	37.40 ⁴⁰	58.8 ¹	50.76 ³³	30.6 ¹¹	21.46 ³⁵	55.1 ¹¹	8.56 ⁴⁴	56.7 ¹⁵
6.8	37.80 ⁴²	58.9 ⁷	51.09 ³⁵	29.5 ¹¹	21.80 ³⁵	54.0 ¹¹	9.02 ⁴⁶	55.4 ¹³
16.8	38.22 ⁴³	59.6 ¹³	51.44 ³⁵	28.4 ¹¹	22.15 ³⁶	52.9 ¹¹	9.50 ⁴⁸	54.4 ⁸
26.7	38.65 ⁴³	60.9 ¹⁹	51.79 ³⁵	27.3 ¹¹	22.51 ³⁶	51.8 ¹¹	9.98 ⁴⁸	53.6 ⁸
10.7	39.08 ⁴²	62.8 ²⁵	52.14 ³⁵	26.2 ¹¹	22.87 ³⁶	50.8 ¹⁰	10.46 ⁴⁸	53.1 ⁵
15.7	39.50 ³⁹	65.3 ³⁰	52.48 ³³	25.2 ¹⁰	23.22 ³⁵	49.9 ⁹	10.93 ⁴⁷	52.9 ²
25.7	39.89 ³⁵	68.3 ³³	52.81 ³⁰	24.4 ⁷	23.55 ³¹	49.1 ⁶	11.38 ⁴²	53.1 ⁵
lec. 5.6	40.24 ³¹	71.6 ³⁶	53.11 ²⁶	23.7 ⁵	23.86 ²⁷	48.5 ⁴	11.80 ³⁶	53.6 ⁹
15.6	40.55 ²⁵	75.2 ³⁸	53.37 ²²	23.2 ³	24.13 ²³	47.9 ²	12.16 ³¹	54.5 ¹¹
25.6	40.80 ¹⁸	79.0 ³⁸	53.59 ²²	22.9 ³	24.36 ²³	47.9 ²	12.47 ³¹	55.6 ¹¹
35.5	40.98 ¹⁸							
δ , Tan δ	1.652	-1.315	1.109	+0.480	1.133	+0.532	1.615	+1.269
an Place	37°.092	74''.71	47°.407	34''.86	18°.059	60''.52	4°.338	70''.18
μ α , D_{μ} α	-0.03	-0.04	+0.01	+0.02	+0.01	+0.02	+0.03	+0.04
δ , D_{μ} δ	-0.2	+0.9	-0.2	+0.9	-0.2	+0.9	-0.2	+0.9

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	ρ Argus. Mag. 2.9		δ H. Ursæ Majoris. Mag. 5.5		γ Argus. Mag. 2.2		ϵ Cancri (mean) Mag. 4.7	
	Right Ascension.	Declination S.	Right Ascension.	Declination N.	Right Ascension.	Declination S.	Right Ascension.	Declination N.
	h m 8 3	° ' -24 3	h m 8 4	° ' +68 43	h m 8 6	° ' -47 4	h m 8 7	° ' +17 5
Jan. 0.6	57.16 ^s	24.4 ^s	27.43 ^s	29.3 ^s	56.75 ^s	59.5 ^s	22.38 ^s	18.7 ^s
10.5	57.32 ¹⁶	27.3 ²⁹	27.82 ³⁹	31.5 ²²	56.91 ¹⁶	63.2 ³⁷	22.57 ¹⁹	18.0 ¹
20.5	57.43 ¹¹	30.2 ²⁹	28.09 ²⁷	33.9 ²⁴	57.00 ⁹	66.8 ³⁶	22.72 ¹⁵	17.5 ¹
30.5	57.48 ⁵	32.9 ²⁷	28.24 ¹⁵	36.4 ²⁵	57.02 ²	70.3 ³⁵	22.81 ⁹	17.2 ¹
Feb. 9.5	57.49 ⁵	35.3 ²⁴	28.25 ¹	38.9 ²⁵	56.98 ⁴	73.7 ³⁴	22.85 ⁴	17.1 ¹
19.4	57.44 ⁹	37.5 ¹⁹	28.14 ²³	41.4 ²²	56.87 ¹⁶	76.7 ²⁷	22.84 ⁶	17.1 ¹
Mar. 1.4	57.35 ¹³	39.4 ¹⁵	27.91 ³³	43.6 ²⁰	56.71 ²⁰	79.4 ²²	22.78 ¹⁰	17.2 ³
11.4	57.22 ¹⁶	40.9 ¹¹	27.58 ⁴⁰	45.6 ¹⁷	56.51 ²⁴	81.6 ¹⁹	22.68 ¹²	17.5 ³
21.3	57.06 ¹⁷	42.0 ⁸	27.18 ⁴⁵	47.3 ¹²	56.27 ²⁷	83.5 ¹⁴	22.56 ¹⁵	17.8 ³
31.3	56.89 ¹⁹	42.8 ⁵	26.73 ⁴⁹	48.5 ⁷	56.00 ²⁸	84.9 ⁸	22.41 ¹⁶	18.1 ³
Apr. 10.3	56.70 ¹⁸	43.3 ¹	26.24 ⁵⁰	49.2 ³	55.72 ²⁸	85.7 ⁴	22.25 ¹⁵	18.4 ³
20.3	56.52 ¹⁷	43.4 ³	25.74 ⁴⁸	49.5 ³	55.44 ²⁷	86.1 ¹	22.10 ¹⁵	18.7 ²
30.2	56.35 ¹⁶	43.1 ⁷	25.26 ⁴⁴	49.2 ⁷	55.17 ²⁵	86.0 ⁵	21.95 ¹³	18.9 ³
May 10.2	56.19 ¹⁴	42.4 ⁹	24.82 ³⁹	48.5 ¹²	54.92 ²⁴	85.5 ¹⁵	21.82 ¹¹	19.2 ¹
20.2	56.05 ¹¹	41.5 ¹³	24.43 ³¹	47.3 ¹⁶	54.68 ²⁰	84.5 ¹⁵	21.71 ⁸	19.3 ²
30.2	55.94 ⁸	40.2 ¹⁵	24.12 ²⁴	45.7 ¹⁹	54.48 ¹⁶	83.0 ¹⁹	21.63 ⁴	19.5 ¹
June 9.1	55.86 ⁵	38.7 ¹⁷	23.88 ¹⁵	43.8 ²³	54.32 ¹²	81.1 ²²	21.59 ¹	19.6 ⁰
19.1	55.81 ²	37.0 ²⁰	23.73 ⁵	41.5 ²⁴	54.20 ⁸	78.9 ²⁴	21.58 ²	19.6 ¹
29.1	55.80 ¹	35.0 ²⁰	23.68 ¹⁴	39.1 ²⁷	54.12 ³	76.5 ²⁷	21.60 ⁵	19.7 ¹
July 9.0	55.82 ⁶	33.0 ²¹	23.72 ¹⁴	36.4 ²⁸	54.09 ¹	73.8 ²⁹	21.65 ⁹	19.6 ⁰
19.0	55.88 ⁹	30.9 ²¹	23.86 ²²	33.6 ²⁸	54.10 ⁷	70.9 ²⁸	21.74 ¹²	19.6 ²
29.0	55.97 ¹²	28.8 ²¹	24.08 ³²	30.8 ²⁸	54.17 ¹¹	68.1 ²⁸	21.86 ¹⁵	19.4 ²
Aug. 8.0	56.09 ¹⁶	26.7 ¹⁹	24.40 ⁴⁰	28.0 ²⁷	54.28 ¹⁶	65.3 ²⁷	22.01 ¹⁸	19.2 ³
17.9	56.25 ¹⁹	24.8 ¹⁶	24.80 ⁴⁷	25.3 ²⁶	54.44 ²¹	62.6 ²⁴	22.19 ²⁰	18.9 ⁴
27.9	56.44 ²²	23.2 ¹³	25.27 ⁵⁴	22.7 ²⁵	54.65 ²⁵	60.2 ²¹	22.39 ²³	18.5 ⁶
Sept. 6.9	56.66 ²⁴	21.9 ¹⁰	25.81 ⁶¹	20.2 ²²	54.90 ²⁹	58.1 ¹⁷	22.62 ²⁵	17.9 ⁷
16.9	56.90 ²⁷	20.9 ⁵	26.42 ⁶⁶	18.0 ²⁰	55.19 ³²	56.4 ¹¹	22.87 ²⁸	17.2 ⁸
26.8	57.17 ²⁹	20.4 ¹	27.08 ⁷¹	16.0 ¹⁷	55.51 ³⁶	55.3 ⁶	23.15 ³⁰	16.4 ¹⁰
Oct. 6.8	57.46 ³¹	20.3 ⁴	27.79 ⁷⁴	14.3 ¹⁴	55.87 ³⁸	54.7 ⁰	23.45 ³¹	15.4 ¹¹
16.8	57.77 ³²	20.7 ⁹	28.53 ⁷⁷	12.9 ⁹	56.25 ³⁹	54.7 ⁶	23.76 ³³	14.3 ¹¹
26.7	58.09 ³²	21.6 ¹⁵	29.30 ⁷⁷	12.0 ⁶	56.64 ⁴⁰	55.3 ¹³	24.09 ³³	13.2 ¹³
Nov. 5.7	58.41 ³³	23.1 ¹⁸	30.07 ⁷⁷	11.4 ¹	57.04 ³⁹	56.6 ¹⁸	24.42 ³³	11.9 ¹³
15.7	58.74 ³¹	24.9 ²²	30.84 ⁷⁵	11.3 ⁸	57.43 ³⁷	58.4 ²⁴	24.75 ³³	10.6 ¹³
25.7	59.05 ²⁹	27.1 ²⁶	31.59 ⁷¹	11.6 ³	57.80 ³⁵	60.8 ³²	25.08 ³²	9.3 ¹²
Dec. 5.6	59.34 ²⁷	29.7 ²⁸	32.30 ⁶⁴	12.4 ¹²	58.15 ³⁰	63.7 ³²	25.40 ²⁹	8.1 ¹¹
15.6	59.61 ²³	32.5 ²⁹	32.94 ⁵⁵	13.6 ¹⁶	58.45 ²⁶	66.9 ³⁵	25.69 ²⁶	7.0 ¹⁰
25.6	59.84 ¹⁹	35.4 ³⁰	33.49 ⁴⁶	15.2 ¹⁹	58.71 ¹⁹	70.4 ³⁶	25.95 ²²	6.0 ⁸
35.5	60.03 ¹⁹	38.4 ³⁰	33.95 ⁴⁶	17.1 ¹⁹	58.90 ¹⁹	74.0 ³⁶	26.17 ²²	5.2 ⁸
Sec δ , Tan δ	1.095	-0.446	2.756	+2.568	1.469	-1.076	1.051	+0.323
Mean Place	55°.427	30''.65	22°.221	32''.57	54°.847	68''.66	20°.353	18''.16
D' ϕ a, D _a a	-0.01	-0.02	+0.06	+0.09	-0.02	-0.04	+0.01	+0.01
D ϕ δ , D _a δ	-0.2	+0.9	-0.2	+0.9	-0.2	+0.9	-0.2	+0.8

FOR THE UPPER TRANSIT AT WASHINGTON.

n Solar late.	Bradley 1147. Mag. 5.7		20 Puppis. Mag. 5.0		β Cancri. Mag. 3.8		31 Lyncis. Mag. 4.4	
	Right Ascension.	Declina- tion N.	Right Ascension.	Declina- tion S.	Right Ascension.	Declina- tion N.	Right Ascension.	Declina- tion N.
	h m 8 8	° ' " +76 0	h m 8 9	° ' " -15 31	h m 8 11	° ' " + 9 26	h m 8 17	° ' " +43 27
l. 0.6	61.44	60.7	27.28	48.0	56.30	55.3	4.12	39.5
10.5	62.00	56 63.1	27.45	50.6	56.49	54.1	4.37	40.3
20.5	62.37	37 65.7	27.57	53.1	56.63	53.1	4.57	41.3
30.5	62.56	19 68.5	27.64	55.4	56.72	52.2	4.69	42.5
b. 9.5	62.56	19 71.3	27.66	57.4	56.76	51.6	4.74	43.9
19.4	62.37	36 74.0	27.63	59.2	56.75	51.1	4.73	45.3
11.4	62.01	51 76.5	27.55	60.7	56.70	50.8	4.66	46.7
11.4	61.50	62 78.7	27.45	62.0	56.61	50.7	4.54	48.1
21.3	60.88	71 80.5	27.31	62.9	56.48	50.7	4.37	49.2
31.3	60.17	76 81.8	27.15	63.5	56.34	50.8	4.17	50.2
11.0.3	59.41	78 82.6	26.99	63.8	56.19	51.0	3.96	50.9
20.3	58.63	76 82.8	26.82	63.8	56.04	51.2	3.74	51.4
30.2	57.87	71 82.5	26.66	63.5	55.90	51.5	3.54	51.6
10.2	57.16	63 81.7	26.52	62.9	55.77	51.8	3.35	51.4
20.2	56.53	54 80.4	26.40	62.1	55.67	52.2	3.19	51.0
30.2	55.99	42 78.6	26.30	61.1	55.59	52.6	3.06	50.3
me 9.1	55.57	28 76.5	26.24	59.8	55.54	53.1	2.97	49.4
19.1	55.29	15 74.0	26.20	58.4	55.52	53.5	2.93	48.3
29.1	55.14	0 71.3	26.19	56.8	55.54	54.0	2.93	47.0
ily 9.0	55.14	13 68.4	26.23	55.1	55.58	54.4	2.98	45.6
19.0	55.27	28 65.4	26.29	53.4	55.66	54.8	3.07	44.0
29.0	55.55	41 62.3	26.38	51.7	55.77	55.1	3.21	42.4
ug. 8.0	55.96	55 59.2	26.50	50.0	55.91	55.4	3.38	40.6
17.9	56.51	66 56.2	26.65	48.6	56.07	55.6	3.59	38.9
27.9	57.17	77 53.3	26.84	47.3	56.26	55.5	3.84	37.2
pt. 6.9	57.94	86 50.7	27.05	46.3	56.48	55.4	4.13	35.4
16.9	58.80	95 48.2	27.28	45.6	56.72	55.0	4.44	33.7
26.8	59.75	103 46.1	27.54	45.3	56.98	54.5	4.78	32.1
t. 6.8	60.78	107 44.3	27.82	45.5	57.27	53.7	5.16	30.5
16.8	61.85	111 42.9	28.12	46.0	57.56	52.7	5.55	29.1
26.7	62.96	113 41.9	28.42	47.0	57.88	51.5	5.96	27.8
iv. 5.7	64.09	111 41.4	28.74	48.4	58.20	50.2	6.38	26.7
15.7	65.20	108 41.4	29.06	50.2	58.53	48.8	6.80	25.8
25.7	66.28	92 41.8	29.37	52.2	58.84	47.2	7.22	25.2
xc. 5.6	67.30	80 42.8	29.66	54.6	59.15	45.6	7.63	24.9
15.6	68.22	65 44.2	29.93	57.1	59.43	44.1	8.00	24.9
25.6	69.02	23 46.0	30.17	59.7	59.69	42.6	8.34	25.2
35.6	69.67	48.3	30.37	62.3	59.90	41.3	8.63	25.8
δ , Tan δ	4.139	+4.016	1.038	-0.278	1.014	+0.166	1.378	+0.948
m Place	53°.844	64''.57	25°.556	53''.12	54°.404	53''.87	1°.414	42''.48
α , D_{α}	+0.09	+0.14	-0.01	-0.01	0.00	+0.01	+0.02	+0.04
δ , D_{δ}	-0.2	+0.8	-0.2	+0.8	-0.2	+0.8	-0.2	+0.8

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	α^1 Cancri. Mag. 5.9		ϵ Argus. Mag. 1.7		30 Monocerotis. Mag. 4.0		θ Chamae Mag.
	Right Ascension.	Declination N.	Right Ascension.	Declination S.	Right Ascension.	Declination S.	Right Ascension.
	h m 8 18	[°] ' " +18 36	h m 8 20	[°] ' " -59 13	h m 8 21	[°] ' " -3 37	h m 8 23
Jan. 0.6	31.95 ^s	21.0	48.39 ^s	57.5	26.62 ^s	39.1	16.54 ^s
10.5	32.16 ²¹	20.3 7	48.58 ¹⁹	61.4 39	26.81 ¹⁹	41.1 20	16.81 ²⁷
20.5	32.32 ¹⁰	19.8 5	48.68 ¹⁰	65.2 38	26.95 ¹⁴	43.0 19	16.88 7
30.5	32.42 ¹⁶	19.5 3	48.69 1	69.0 38	27.04 9	44.6 16	16.77 11
Feb. 9.5	32.47 ⁵	19.4 1	48.62 7	72.7 37	27.08 4	46.1 15	16.47 30
	32.47 ⁰	19.4 1	48.62 ¹⁵	72.7 34	27.08 1	46.1 12	16.47 46
19.4	32.47	19.5	48.47	76.1	27.07	47.3	16.01
Mar. 1.4	32.42 ⁵	19.7 2	48.25 ²²	79.2 31	27.02 5	48.3 10	15.40 61
11.4	32.33 ⁹	20.0 3	47.97 ²⁸	81.8 26	26.93 9	49.0 7	14.65 75
21.4	32.21 ¹²	20.3 3	47.64 ³³	84.1 23	26.81 ¹²	49.5 5	13.80 85
31.3	32.07 ¹⁴	20.7 4	47.27 ³⁷	85.9 18	26.67 ¹⁴	49.8 3	12.87 93
	32.07 ¹⁶	20.7 3	47.27 ³⁸	85.9 12	26.67 ¹⁴	49.8 1	12.87 99
Apr. 10.3	31.91	21.0	46.89	87.1	26.53	49.9	11.88
20.3	31.76 ¹⁵	21.4 4	46.49 ⁴⁰	87.9 8	26.38 ¹⁵	49.8 1	10.86 102
30.2	31.61 ¹⁵	21.7 3	46.10 ³⁹	88.1 2	26.23 ¹⁵	49.5 3	9.84 102
May 10.2	31.48 ¹³	21.9 2	45.72 ³⁸	87.8 3	26.10 ¹³	49.1 4	8.84 100
20.2	31.37 ¹¹	22.1 2	45.37 ³⁵	87.0 8	25.99 ¹¹	48.5 6	7.88 90
	31.37 ⁹	22.1 2	45.37 ³²	87.0 12	25.99 9	48.5 8	7.88 89
30.2	31.28	22.3	45.05	85.8	25.90	47.7	6.99
June 9.1	31.23 ⁵	22.3 0	44.78 ²⁷	84.0 18	25.84 6	46.9 8	6.18 81
19.1	31.21 ²	22.4 1	44.55 ²³	81.9 21	25.81 3	45.9 10	5.48 70
29.1	31.22 1	22.3 0	44.38 ¹⁷	79.4 25	25.81 0	44.9 10	4.91 57
July 9.1	31.26 ⁴	22.3 0	44.27 ¹¹	76.7 27	25.84 3	43.8 11	4.47 44
	31.26 ⁸	22.3 2	44.27 5	76.7 30	25.84 6	43.8 11	4.47 28
19.0	31.34	22.1	44.22	73.7	25.90	42.7	4.19
29.0	31.45 ¹¹	21.9 2	44.24 2	70.7 30	25.99 9	41.6 11	4.07 12
Aug. 8.0	31.59 ¹⁴	21.6 3	44.32 8	67.6 31	26.10 11	40.6 10	4.11 4
17.9	31.75 ¹⁶	21.2 4	44.48 ¹⁶	64.7 29	26.25 ¹⁵	39.8 8	4.32 21
27.9	31.95 ²⁰	20.7 5	44.70 ²²	62.0 27	26.43 ¹⁸	39.1 7	4.70 38
	31.95 ²²	20.7 6	44.70 ²⁸	62.0 25	26.43 20	39.1 4	4.70 53
Sept. 6.9	32.17	20.1	44.98	59.5	26.63	38.7	5.23
16.9	32.42 ²⁵	19.3 8	45.32 ³⁴	57.5 20	26.85 ²²	38.5 2	5.91 68
26.8	32.69 ²⁷	18.4 9	45.71 ³⁹	56.0 15	27.10 ²⁵	38.6 1	6.72 81
Oct. 6.8	32.98 ²⁹	17.4 10	46.15 ⁴⁴	55.0 10	27.37 ²⁷	39.0 4	7.63 91
16.8	33.29 ³¹	16.3 11	46.62 ⁴⁷	54.7 3	27.66 ²⁹	39.8 8	8.62 99
	33.29 ³²	16.3 13	46.62 49	54.7 3	27.66 31	39.8 11	8.62 102
26.8	33.61	15.0	47.11	55.0	27.97	40.9	9.64
Nov. 5.7	33.94 ³³	13.7 13	47.61 ⁵⁰	56.0 10	28.28 ³¹	42.3 14	10.67 103
15.7	34.28 ³⁴	12.3 14	48.10 ⁴⁹	57.7 17	28.60 ³²	43.9 16	11.68 101
25.7	34.62 ³⁴	11.0 13	48.57 ⁴⁷	59.9 22	28.91 ³¹	45.8 19	12.62 94
Dec. 5.6	34.94 ³²	9.7 13	49.01 ⁴⁴	62.7 28	29.21 ³⁰	47.8 20	13.46 84
	34.94 ³⁰	9.7 12	49.01 ³⁸	62.7 31	29.21 28	47.8 21	13.46 71
15.6	35.24	8.5	49.39	65.8	29.49	49.9	14.17
25.6	35.51 ²⁷	7.5 10	49.70 ³¹	69.4 36	29.75 ²⁶	52.0 21	14.73 56
35.6	35.75 ²⁴	6.7 8	49.94 ²⁴	73.1 37	29.96 ²¹	54.1 21	15.11 38
Sec δ , Tan δ	1.055	+0.337	1.955	-1.680	1.002	-0.063	4.517
Mean Place	29 ^h .938	21 ^m .16	46 ^h .247	68 ^m .47	24 ^h .869	42 ^m .18	12 ^h .619 3
D ['] ϕ α , D ω α	+0.01	+0.01	-0.04	-0.06	0.00	0.00	-0.09
D ['] ϕ δ , D ω δ	-0.2	+0.8	-0.2	+0.8	-0.2	+0.8	-0.2

FOR THE UPPER TRANSIT AT WASHINGTON.

in Solar Date.	o Ursæ Majoris. Mag. 3.5		Groombridge 1450. Mag. 6.0		7 Cancri. Mag. 5.5		Groombridge 1446. Mag. 6.3	
	Right Ascension.	Declination N.	Right Ascension.	Declination N.	Right Ascension.	Declination N.	Right Ascension.	Declination N.
	h m 8 23	° ' s +60 59	h m 8 27	° ' s +38 18	h m 8 27	° ' s +20 43	h m 8 30	° ' s +73 55
1. O.6	16.84 ⁵	67.6 ¹⁷	26.19 ⁵	28.3 ¹¹	49.79 ⁵	49.3 ¹¹	23.78 ⁵	35.0 ¹¹
10.5	17.19 ³⁵	69.3 ¹⁷	26.45 ²⁶	28.7 ⁴	50.01 ²²	48.7 ⁶	24.34 ⁵⁶	37.2 ²²
20.5	17.45 ²⁶	71.2 ¹⁹	26.64 ¹⁹	29.4 ⁷	50.18 ¹⁷	48.3 ⁴	24.75 ⁴¹	39.7 ²⁵
30.5	17.61 ¹⁶	73.3 ²¹	26.77 ¹³	30.3 ⁹	50.29 ¹¹	48.2 ¹	24.99 ²⁴	42.4 ²⁷
3. 9.5	17.68 ⁷	75.6 ²³	26.84 ⁷	31.4 ¹¹	50.35 ⁶	48.2 ⁰	25.07 ⁸	45.1 ²⁷
	17.68 ⁴	75.6 ²²	26.84 ⁰	31.4 ¹¹	50.35 ¹	48.2 ¹	25.07 ⁹	45.1 ²⁷
19.4	17.64 ¹²	77.8 ²²	26.84 ⁵	32.5 ¹²	50.36 ⁴	48.3 ³	24.98 ²⁴	47.8 ²⁶
r. 1.4	17.52 ²⁰	80.0 ¹⁹	26.79 ¹⁰	33.7 ¹²	50.32 ⁸	48.6 ⁴	24.74 ³⁸	50.4 ²³
11.4	17.32 ²⁷	81.9 ¹⁷	26.69 ¹⁵	34.9 ¹¹	50.24 ¹²	49.0 ⁵	24.36 ⁴⁹	52.7 ¹⁹
21.4	17.05 ³²	83.6 ¹³	26.54 ¹⁷	36.0 ⁹	50.12 ¹⁴	49.5 ⁴	23.87 ⁵⁸	54.6 ¹⁵
31.3	16.73 ³⁴	84.9 ⁹	26.37 ¹⁹	36.9 ⁸	49.98 ¹⁵	49.9 ⁵	23.29 ⁶⁴	56.1 ¹¹
r. 10.3	16.39 ³⁵	85.8 ⁵	26.18 ²⁰	37.7 ⁵	49.83 ¹⁶	50.4 ⁴	22.65 ⁶⁶	57.2 ⁵
20.3	16.04 ³⁴	86.3 ¹	25.98 ¹⁹	38.2 ³	49.67 ¹⁵	50.8 ³	21.99 ⁶⁶	57.7 ⁰
ay 10.2	15.38 ³²	86.0 ⁴	25.62 ¹⁷	38.5 ⁰	49.52 ¹³	51.1 ³	21.33 ⁶³	57.7 ⁵
20.2	15.09 ²⁴	85.2 ¹²	25.47 ¹²	38.3 ⁵	49.39 ¹²	51.4 ¹	20.70 ⁵⁸	57.2 ¹⁰
	15.09 ²⁴	85.2 ¹²	25.47 ¹²	38.3 ⁵	49.27 ⁹	51.5 ¹	20.12 ⁵⁰	56.2 ¹⁵
30.2	14.85 ¹⁸	84.0 ¹⁵	25.35 ⁸	37.8 ⁶	49.18 ⁶	51.6 ⁰	19.62 ⁴⁰	54.7 ¹⁹
me 9.1	14.67 ¹¹	82.5 ¹⁹	25.27 ⁴	37.2 ⁹	49.12 ³	51.6 ⁰	19.22 ³⁰	52.8 ²³
19.1	14.56 ⁵	80.6 ²¹	25.23 ¹	36.3 ¹⁰	49.09 ⁰	51.6 ²	18.92 ¹⁹	50.5 ²⁵
29.1	14.51 ¹	78.5 ²²	25.22 ⁴	35.3 ¹²	49.09 ⁶	51.5 ²	18.73 ⁶	48.0 ²⁸
ly 9.1	14.52 ⁹	76.3 ²⁵	25.26 ⁸	34.1 ¹²	49.13 ⁶	51.3 ³	18.67 ⁶	45.2 ³⁰
	14.61 ¹⁵	73.8 ²⁵	25.34 ¹¹	32.9 ¹⁴	49.19 ¹⁰	51.0 ⁴	18.73 ¹⁷	42.2 ³⁰
29.0	14.76 ²²	71.3 ²⁶	25.45 ¹⁵	31.5 ¹⁵	49.29 ¹³	50.6 ⁴	18.90 ³⁰	39.2 ³¹
ug. 8.0	14.98 ²⁷	68.7 ²⁶	25.60 ¹⁹	30.0 ¹⁵	49.42 ¹⁶	50.2 ⁶	19.20 ⁴⁰	36.1 ³¹
17.9	15.25 ³⁴	66.1 ²⁵	25.79 ²²	28.5 ¹⁶	49.58 ¹⁹	49.6 ⁶	19.60 ⁵²	33.0 ³⁰
27.9	15.59 ³⁹	63.6 ²⁴	26.01 ²⁶	26.9 ¹⁶	49.77 ²²	49.0 ⁸	20.12 ⁶¹	30.0 ²⁹
ept. 6.9	15.98 ⁴³	61.2 ²³	26.27 ²⁸	25.3 ¹⁶	49.99 ²⁴	48.2 ⁹	20.73 ⁷⁰	27.1 ²⁶
16.9	16.41 ⁴⁹	58.9 ²¹	26.55 ³¹	23.7 ¹⁶	50.23 ²⁷	47.3 ¹⁰	21.43 ⁷⁹	24.5 ²⁴
26.8	16.90 ⁵²	56.8 ¹⁹	26.86 ³⁴	22.1 ¹⁶	50.50 ²⁹	46.3 ¹¹	22.22 ⁸⁶	22.1 ²¹
ct. 6.8	17.42 ⁵⁵	54.9 ¹⁶	27.20 ³⁶	20.5 ¹⁵	50.79 ³¹	45.2 ¹³	23.08 ⁹¹	20.0 ¹⁷
16.8	17.97 ⁵⁸	53.3 ¹⁴	27.56 ³⁸	19.0 ¹⁴	51.10 ³³	43.9 ¹³	23.99 ⁹⁵	18.3 ¹³
	18.55 ⁶⁰	51.9 ⁹	27.94 ⁴⁰	17.6 ¹³	51.43 ³⁴	42.6 ¹⁴	24.94 ⁹⁸	17.0 ⁹
ov. 5.7	19.15 ⁵⁹	51.0 ⁶	28.34 ⁴⁰	16.3 ¹⁰	51.77 ³⁴	41.2 ¹⁴	25.92 ⁹⁹	16.1 ⁵
15.7	19.74 ⁵⁹	50.4 ²	28.74 ³⁹	15.3 ⁹	52.11 ³⁴	39.8 ¹²	26.91 ⁹⁷	15.6 ¹
25.7	20.33 ⁵⁷	50.2 ³	29.13 ³⁸	14.4 ⁶	52.45 ³⁴	38.4 ¹⁴	27.88 ⁹²	15.7 ⁶
ec. 5.6	20.90 ⁵²	50.5 ⁷	29.51 ³⁶	13.8 ⁴	52.79 ³¹	37.2 ¹¹	28.80 ⁸⁶	16.3 ¹¹
	21.42 ⁴⁷	51.2 ¹⁰	29.87 ³³	13.4 ⁰	53.10 ²⁸	36.1 ¹⁰	29.66 ⁷⁶	17.4 ¹⁵
25.6	21.89 ⁴⁰	52.2 ¹⁵	30.20 ²⁸	13.4 ²	53.38 ²⁴	35.1 ⁷	30.42 ⁶⁴	18.9 ¹⁹
35.6	22.29 ⁴⁰	53.7 ¹⁵	30.48 ²⁸	13.6 ²	53.62 ²⁴	34.4 ⁷	31.06 ⁶⁴	20.8 ¹⁹
δ, Tan δ in Place	2.063 12°.908	+1.804 72''.47	1.274 23°.718	+0.790 31''.60	1.069 47°.760	+0.378 50''.34	3.612 17°.206	+3.471 41''.20
α, D _α α β, D _β β	+0.04 -0.2	+0.07 +0.8	+0.02 -0.2	+0.03 +0.8	+0.01 -0.2	+0.02 +0.8	+0.07 -0.2	+0.14 +0.8

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	δ Hydræ. Mag. 4.2		σ Hydræ. Mag. 4.5		γ Canceri. Mag. 4.7		δ Canceri. Mag. 4.2	
	Right Ascension.	Declination N.	Right Ascension.	Declination N.	Right Ascension.	Declination N.	Right Ascension.	Declination N.
	h m 8 33	° ' " + 5 59	h m 8 34	° ' " + 3 38	h m 8 38	° ' " + 21 46	h m 8 39	° ' " + 18 27
Jan. 0.6	11.26 ^s	64.3 ^s	20.74 ^s	27.7 ^s	24.22 ^s	28.0 ^s	53.38 ^s	61.3 ^s
10.6	11.47 ²¹	62.8 ¹⁵	20.94 ²⁰	26.1 ¹⁶	24.45 ²³	27.4 ⁶	53.61 ²³	60.5 ⁸
20.5	11.63 ¹⁶	61.5 ¹³	21.10 ¹⁶	24.6 ¹⁵	24.63 ¹⁸	27.0 ⁴	53.79 ¹⁸	60.0 ⁵
30.5	11.74 ¹¹	60.4 ¹¹	21.21 ¹¹	23.3 ¹³	24.76 ¹³	26.9 ¹	53.92 ¹³	59.6 ⁴
Feb. 9.5	11.80 ⁶	59.5 ⁹	21.27 ⁶	22.3 ¹⁰	24.83 ⁷	27.0 ¹	53.99 ⁷	59.4 ²
19.4	11.81 ¹	58.8 ⁷	21.28 ¹	21.4 ⁹	24.85 ²	27.2 ²	54.01 ²	59.5 ¹
Mar. 1.4	11.77 ⁴	58.3 ⁵	21.24 ⁴	20.8 ⁶	24.82 ³	27.6 ⁴	53.98 ³	59.7 ²
11.4	11.70 ⁷	58.0 ³	21.17 ⁷	20.4 ⁴	24.74 ⁸	28.0 ⁴	53.91 ⁷	60.0 ³
21.4	11.59 ¹¹	57.8 ²	21.06 ¹¹	20.2 ²	24.63 ¹¹	28.6 ⁶	53.80 ¹¹	60.3 ³
31.3	11.46 ¹³	57.8 ⁰	20.93 ¹³	20.1 ¹	24.50 ¹³	29.1 ⁵	53.67 ¹³	60.8 ⁵
Apr. 10.3	11.32 ¹⁴	57.9 ¹	20.80 ¹³	20.1 ¹	24.35 ¹⁵	29.6 ⁵	53.52 ¹⁵	61.2 ⁴
20.3	11.17 ¹⁵	58.2 ³	20.65 ¹⁵	20.2 ¹	24.19 ¹⁶	30.0 ⁴	53.37 ¹⁵	61.6 ⁴
30.3	11.03 ¹⁴	58.5 ³	20.51 ¹⁴	20.6 ³	24.04 ¹⁵	30.4 ⁴	53.23 ¹⁴	62.0 ⁴
May 10.2	10.90 ¹³	58.9 ⁴	20.38 ¹³	21.0 ⁴	23.90 ¹⁴	30.7 ³	53.09 ¹⁴	62.3 ³
20.2	10.79 ¹¹	59.3 ⁴	20.27 ¹¹	21.5 ⁵	23.78 ¹²	30.9 ²	52.97 ¹²	62.5 ²
30.2	10.70 ⁹	59.8 ⁵	20.18 ⁹	22.1 ⁶	23.68 ¹⁰	31.0 ¹	52.88 ⁹	62.7 ¹
June 9.1	10.64 ⁶	60.3 ⁵	20.11 ⁷	22.7 ⁶	23.62 ⁶	31.0 ⁰	52.81 ⁷	62.8 ¹
19.1	10.61 ³	60.9 ⁶	20.08 ³	23.3 ⁶	23.58 ⁴	30.9 ¹	52.78 ³	62.9 ¹
29.1	10.61 ⁰	61.5 ⁶	20.07 ¹	24.0 ⁷	23.57 ¹	30.7 ²	52.77 ¹	62.8 ⁰
July 9.1	10.63 ²	62.1 ⁶	20.10 ³	24.7 ⁷	23.60 ³	30.5 ²	52.79 ²	62.8 ²
19.0	10.69 ⁶	62.6 ⁵	20.15 ⁵	25.4 ⁷	23.66 ⁶	30.1 ⁴	52.85 ⁶	62.6 ³
29.0	10.77 ⁸	63.1 ⁵	20.24 ⁹	26.0 ⁶	23.75 ⁹	29.7 ⁴	52.94 ⁹	62.3 ³
Aug. 8.0	10.89 ¹²	63.5 ⁴	20.35 ¹¹	26.5 ⁵	23.87 ¹²	29.1 ⁶	53.05 ¹¹	62.0 ⁵
18.0	11.03 ¹⁴	63.8 ³	20.49 ¹⁴	27.0 ⁵	24.02 ¹⁵	28.5 ⁶	53.20 ¹⁵	61.5 ⁶
27.9	11.20 ¹⁷	63.9 ¹	20.65 ¹⁶	27.2 ²	24.20 ¹⁸	27.7 ⁸	53.38 ¹⁸	60.9 ⁷
Sept. 6.9	11.40 ²⁰	63.9 ⁰	20.85 ²⁰	27.2 ¹	24.41 ²¹	26.8 ⁹	53.58 ²⁰	60.2 ⁸
16.9	11.62 ²²	63.6 ³	21.07 ²²	27.1 ²	24.64 ²³	25.8 ¹⁰	53.81 ²³	59.4 ¹⁰
26.8	11.86 ²⁴	63.1 ⁵	21.31 ²⁴	26.7 ⁴	24.90 ²⁶	24.7 ¹¹	54.06 ²⁵	58.4 ¹²
Oct. 6.8	12.13 ²⁷	62.4 ⁷	21.58 ²⁷	26.1 ⁶	25.19 ²⁹	23.5 ¹²	54.34 ²⁸	57.2 ¹³
16.8	12.42 ²⁹	61.4 ¹⁰	21.87 ²⁹	25.1 ¹⁰	25.50 ³¹	22.2 ¹³	54.64 ³⁰	55.9 ¹⁴
26.8	12.73 ³¹	60.2 ¹²	22.17 ³⁰	25.1 ¹²	25.82 ³²	20.8 ¹⁴	54.96 ³²	54.5 ¹⁴
Nov. 5.7	13.04 ³¹	58.8 ¹⁴	22.49 ³²	23.9 ¹⁴	26.16 ³⁴	19.3 ¹⁵	55.29 ³³	53.1 ¹⁵
15.7	13.37 ³³	57.2 ¹⁶	22.81 ³²	22.5 ¹⁶	26.51 ³⁵	17.9 ¹⁴	55.63 ³⁴	51.6 ¹⁵
25.7	13.69 ³³	55.5 ¹⁷	23.13 ³²	19.2 ¹⁷	26.85 ³⁴	16.5 ¹⁴	55.97 ³⁴	50.1 ¹⁵
Dec. 5.7	14.00 ³¹	53.7 ¹⁸	23.44 ³¹	17.3 ¹⁹	27.19 ³⁴	15.2 ¹³	56.30 ³³	48.7 ¹⁴
15.6	14.30 ³⁰	52.0 ¹⁷	23.73 ²⁹	15.5 ¹⁸	27.51 ³²	14.0 ¹²	56.62 ³²	47.4 ¹²
25.6	14.56 ²⁶	50.3 ¹⁷	24.00 ²⁷	13.6 ¹⁹	27.80 ²⁹	13.1 ⁹	56.91 ²⁹	46.2 ⁹
35.6	14.79 ²³	48.7 ¹⁶	24.23 ²³	11.9 ¹⁷	28.06 ²⁶	12.3 ⁸	57.16 ²⁵	45.3 ⁸
Sec δ , Tan δ	1.005	+0.105	1.002	+0.064	1.077	+0.399	1.054	+0.334
Mean Place	9 ^h .464	63 ^m .19	18 ^h .967	26 ^m .23	22 ^h .201	29 ^m .82	51 ^h .429	62 ^m .70
D ψ α , D ω α	0.00	0.00	0.00	0.00	+0.01	+0.02	+0.01	+0.01
D ψ δ , D ω δ	-0.2	+0.8	-0.2	+0.8	-0.3	+0.8	-0.3	+0.8

FOR THE UPPER TRANSIT AT WASHINGTON.

Solar etc.	α Pyridis. Mag. 3.7		γ Cancri. Mag. 4.2		ϵ Hydræ. Mag. 3.5		δ Argus. Mag. 2.6	
	Right Ascension.	Declina- tion S.	Right Ascension.	Declina- tion N.	Right Ascension.	Declina- tion N.	Right Ascension.	Declina- tion S.
	h m 8 40	° ' —32 52	h m 8 41	° ' +29 3	h m 8 42	° ' + 6 43	h m 8 42	° ' —54 23
	s 12.19	" 38.1	s 35.63	" 74.5	s 18.36	" 53.7	s 23.05	" 37.1
0.6	12.19 ¹⁹	38.1 ³³	35.63 ²⁴	74.5 ²	18.36 ²²	53.7 ¹⁵	23.05 ²²	37.1 ³⁸
10.6	12.38 ¹⁵	41.4 ³²	35.87 ¹⁹	74.3 ¹	18.58 ¹⁷	52.2 ¹³	23.27 ¹⁴	40.9 ³⁸
20.5	12.53 ⁹	44.6 ³⁰	36.06 ¹⁴	74.4 ³	18.75 ¹²	50.9 ⁶	23.41 ⁷	44.7 ³⁸
30.5	12.62 ³	47.8 ²⁷	36.20 ⁸	74.7 ⁵	18.87 ⁶	49.8 ²	23.48 ¹	48.5 ³⁶
1. 9.5	12.65 ²	50.8 ²⁷	36.28 ²	75.2 ⁷	18.93 ²	48.9 ⁶	23.47 ⁸	52.1 ³⁵
19.4	12.63 ⁸	53.5 ²⁵	36.30 ³	75.9 ⁸	18.95 ³	48.3 ⁵	23.39 ¹⁵	55.6 ³¹
1. 1.4	12.55 ¹¹	56.0 ²¹	36.27 ⁷	76.7 ⁸	18.92 ⁶	47.8 ³	23.24 ²¹	58.7 ²⁸
11.4	12.44 ¹⁵	58.1 ¹⁷	36.20 ¹²	77.5 ⁸	18.86 ¹⁰	47.5 ¹	23.03 ²⁵	61.5 ²⁴
21.4	12.29 ¹⁸	59.8 ¹³	36.08 ¹⁴	78.3 ⁸	18.76 ¹³	47.4 ¹	22.78 ²⁸	63.9 ²⁰
31.3	12.11 ¹⁹	61.1 ⁹	35.94 ¹⁶	79.1 ⁶	18.63 ¹⁴	47.5 ¹	22.50 ³¹	65.9 ¹⁴
10.3	11.92 ¹⁹	62.0 ⁵	35.78 ¹⁷	79.7 ⁶	18.49 ¹⁴	47.6 ²	22.19 ³³	67.3 ¹⁰
20.3	11.73 ²⁰	62.5 ¹	35.61 ¹⁶	80.3 ⁴	18.35 ¹⁴	47.8 ³	21.86 ³²	68.3 ⁴
30.3	11.53 ¹⁸	62.6 ³	35.45 ¹⁵	80.7 ²	18.21 ¹³	48.1 ⁴	21.54 ³²	68.7 ⁶
10.2	11.35 ¹⁷	62.3 ⁷	35.30 ¹³	80.9 ¹	18.08 ¹¹	48.5 ⁴	21.22 ³⁰	68.7 ¹⁰
20.2	11.18 ¹⁵	61.6 ¹⁰	35.17 ¹¹	81.0 ¹	17.97 ⁹	49.0 ⁴	20.92 ²⁷	68.1 ¹⁰
30.2	11.03 ¹²	60.6 ¹⁴	35.06 ⁸	80.9 ³	17.88 ⁷	49.4 ⁶	20.65 ²⁴	67.1 ¹⁵
e 9.1	10.91 ⁹	59.2 ¹⁷	34.98 ⁴	80.6 ⁴	17.81 ⁴	50.0 ⁵	20.41 ²⁰	65.6 ¹⁹
19.1	10.82 ⁶	57.5 ²⁰	34.94 ¹	80.2 ⁵	17.77 ¹	50.5 ⁵	20.21 ¹⁵	63.7 ²³
29.1	10.76 ³	55.5 ²²	34.93 ⁶	79.7 ⁸	17.76 ⁵	51.0 ⁵	20.06 ¹¹	61.4 ²⁵
7 9.1	10.73 ¹	53.3 ²³	34.95 ²	79.1 ⁸	17.78 ⁵	51.5 ⁵	19.95 ⁶	58.9 ²⁸
19.0	10.74 ⁵	51.0 ²³	35.01 ⁹	78.3 ⁹	17.83 ⁷	52.0 ⁵	19.89 ⁶	56.1 ²⁹
29.0	10.79 ⁸	48.7 ²³	35.10 ¹²	77.4 ¹⁰	17.90 ¹¹	52.5 ³	19.89 ⁶	53.2 ²⁹
5. 8.0	10.87 ¹²	46.4 ²²	35.22 ¹⁶	76.4 ¹⁰	18.01 ¹³	52.8 ²	19.95 ¹¹	50.3 ²⁹
18.0	10.99 ¹⁶	44.2 ²¹	35.38 ¹⁹	75.4 ¹²	18.14 ¹⁶	53.0 ¹	20.06 ¹⁸	47.4 ²⁷
27.9	11.15 ¹⁹	42.1 ¹⁷	35.57 ²¹	74.2 ¹³	18.30 ¹⁹	53.1 ¹	20.24 ²³	44.7 ²⁴
t. 6.9	11.34 ²²	40.4 ¹⁴	35.78 ²⁵	72.9 ¹³	18.49 ²²	53.0 ³	20.47 ²⁸	42.3 ²¹
16.9	11.56 ²⁶	39.0 ¹⁰	36.03 ²⁷	71.6 ¹⁴	18.71 ²⁴	52.7 ⁶	20.75 ³³	40.2 ¹⁶
26.8	11.82 ²⁹	38.0 ⁵	36.30 ³⁰	70.2 ¹⁵	18.95 ²⁶	52.1 ⁸	21.08 ³⁸	38.6 ¹⁰
6.8	12.11 ³²	37.5 ⁰	36.60 ³²	68.7 ¹⁵	19.21 ²⁹	51.3 ¹⁰	21.46 ⁴¹	37.6 ⁵
16.8	12.43 ³³	37.5 ⁶	36.92 ³⁴	67.2 ¹⁴	19.50 ³⁰	50.3 ¹³	21.87 ⁴⁴	37.1 ²
26.8	12.76 ³⁵	38.1 ¹¹	37.26 ³⁶	65.8 ¹⁵	19.80 ³²	49.0 ¹⁴	22.31 ⁴⁶	37.3 ⁸
v. 5.7	13.11 ³⁵	39.2 ¹⁷	37.62 ³⁷	64.3 ¹⁴	20.12 ³²	47.6 ¹⁶	22.77 ⁴⁶	38.1 ¹⁴
15.7	13.46 ³⁴	40.9 ²¹	37.99 ³⁶	62.9 ¹²	20.44 ³³	46.0 ¹⁷	23.23 ⁴⁴	39.5 ²¹
25.7	13.80 ³³	43.0 ²⁶	38.35 ³⁶	61.7 ¹¹	20.77 ³³	44.3 ¹⁸	23.67 ⁴²	41.6 ²⁶
2. 5.7	14.13 ³¹	45.6 ²⁹	38.71 ³⁴	60.6 ⁹	21.09 ²⁹	42.5 ¹⁸	24.09 ³⁸	44.2 ³⁰
15.6	14.44 ²⁷	48.5 ³¹	39.05 ³¹	59.7 ⁶	21.38 ²⁸	40.7 ¹⁷	24.47 ³²	47.2 ³⁴
25.6	14.71 ²³	51.6 ³²	39.36 ²⁷	59.1 ³	21.66 ²⁴	39.0 ¹⁶	24.79 ²⁶	50.6 ³⁷
35.6	14.94 ²³	54.8 ³²	39.63 ²⁷	58.8 ³	21.90 ²⁴	37.4 ¹⁶	25.05 ²⁶	54.3 ³⁷
1. Tan δ	1.191	—0.646	1.144	+0.556	1.007	+0.118	1.718	—1.397
2 Place	10°.562	45'' .90	33°.460	77'' .68	16°.581	53'' .13	21°.198	48'' .19
3. D _u α	—0.01	—0.03	+0.01	+0.02	0.00	+0.01	—0.03	—0.06
4. D _u δ	—0.3	+0.8	—0.3	+0.8	—0.3	+0.8	—0.3	+0.8

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	σ^2 Cancri (mean). Mag. 5.5		ζ Hydræ. Mag. 3.3		ι Ursæ Majoris. Mag. 3.1		α Cancri. Mag. 4.3	
	Right Ascension.	Declination N.	Right Ascension.	Declination N.	Right Ascension.	Declination N.	Right Ascension.	Declination N.
	h m 8 49	° ' s + 30 53	h m 8 50	° ' s + 6 15	h m 8 53	° ' s + 48 22	h m 8 53	° ' s + 12
Jan. 0.6	5.94	63.6	55.91	71.3	26.54	27.6	52.24	73.6
10.6	6.20	63.5	56.13	69.8	26.85	28.4	52.47	72.4
20.5	6.40	63.6	56.31	68.4	27.10	29.5	52.66	71.4
30.5	6.55	64.0	56.43	67.3	27.28	30.9	52.79	70.6
Feb. 9.5	6.64	64.6	56.51	66.3	27.39	32.5	52.87	70.0
19.5	6.67	65.4	56.53	65.6	27.42	34.2	52.90	69.7
Mar. 1.4	6.64	66.3	56.51	65.1	27.38	36.0	52.89	69.5
11.4	6.57	67.2	56.45	64.8	27.28	37.7	52.83	69.5
21.4	6.46	68.1	56.36	64.7	27.13	39.2	52.74	69.7
31.3	6.32	68.9	56.24	64.7	26.93	40.6	52.62	69.9
Apr. 10.3	6.16	69.7	56.11	64.9	26.71	41.7	52.48	70.2
20.3	5.99	70.3	55.97	65.1	26.48	42.5	52.34	70.5
30.3	5.83	70.8	55.83	65.4	26.25	42.9	52.20	70.9
May 10.2	5.67	71.0	55.70	65.8	26.03	43.1	52.07	71.3
20.2	5.54	71.1	55.58	66.2	25.82	42.9	51.96	71.7
30.2	5.42	71.0	55.49	66.7	25.65	42.3	51.86	72.0
June 9.2	5.34	70.7	55.42	67.3	25.51	41.4	51.79	72.4
19.1	5.28	70.3	55.37	67.8	25.42	40.3	51.74	72.7
29.1	5.26	69.7	55.36	68.3	25.37	38.9	51.73	73.0
July 9.1	5.28	68.9	55.37	68.9	25.36	37.2	51.74	73.2
19.0	5.33	68.0	55.41	69.4	25.40	35.4	51.78	73.4
29.0	5.41	67.0	55.48	69.8	25.48	33.4	51.85	73.5
Aug. 8.0	5.53	65.9	55.58	70.2	25.61	31.4	51.95	73.5
18.0	5.68	64.7	55.70	70.4	25.78	29.2	52.08	73.3
27.9	5.86	63.4	55.86	70.4	26.00	27.0	52.23	73.1
Sept. 6.9	6.08	62.0	56.04	70.3	26.26	24.8	52.41	72.6
16.9	6.32	60.6	56.24	70.0	26.55	22.6	52.62	72.0
26.9	6.59	59.1	56.48	69.5	26.88	20.4	52.86	71.2
Oct. 6.8	6.89	57.5	56.74	68.7	27.25	18.4	53.12	70.2
16.8	7.21	55.9	57.02	67.7	27.65	16.5	53.41	69.0
26.8	7.56	54.4	57.32	66.4	28.07	14.8	53.71	67.6
Nov. 5.7	7.92	52.9	57.63	64.9	28.51	13.3	54.04	66.1
15.7	8.29	51.4	57.96	63.3	28.97	12.1	54.37	64.5
25.7	8.66	50.2	58.29	61.5	29.43	11.2	54.70	62.8
Dec. 5.7	9.03	49.1	58.61	59.7	29.88	10.6	55.03	61.2
15.6	9.38	48.3	58.91	57.9	30.31	10.4	55.34	59.6
25.6	9.70	47.7	59.19	56.2	30.70	10.6	55.63	58.1
35.6	9.98	47.4	59.43	54.5	31.05	11.2	55.88	56.7
Sec δ , Tan δ	1.165	+0.598	1.006	+0.110	1.505	+1.125	1.083	+0.216
Mean Place	3 ^h .755	67 ^m .52	54 ^m .154	71 ^m .00	23 ^h .714	34 ^m .26	50 ^m .424	74 ^m .60
D' ϕ α , D ω α	+0.01	+0.03	0.00	0.00	+0.02	+0.05	0.00	+0.01
D' ϕ δ , D ω δ	-0.3	+0.7	-0.3	+0.7	-0.3	+0.7	-0.3	+0.7

FOR THE UPPER TRANSIT AT WASHINGTON

Solar date.	β^1 Carinae. Mag. 5.1		κ Ursæ Majoris. Mag. 3.7		σ^2 Ursæ Majoris. Mag. 4.9		κ Cancri. Mag. 5.1	
	Right Ascension.	Declina- tion S.	Right Ascension.	Declina- tion N.	Right Ascension.	Declina- tion N.	Right Ascension.	Declina- tion N.
	h m 8 54	° ' -58 53	h m 8 57	° ' +47 29	h m 9 2	° ' +67 28	h m 9 3	° ' +11 0
	s 55.44	" 51.9	s 52.54	" 29.6	s 60.66	" 41.1	s 10.49	" 38.1
0.6	55.44 ²⁵	55.6 ³⁷	52.54 ³¹	29.6 ⁷	61.15 ⁴⁹	42.8 ¹⁷	10.73 ²⁴	36.8 ¹³
10.6	55.69 ¹⁷	59.5 ³⁹	53.11 ²⁶	31.4 ¹¹	61.54 ³⁹	44.8 ²⁰	10.92 ¹⁹	35.7 ¹¹
20.5	55.86 ¹⁷	63.4 ³⁸	53.29 ¹⁸	32.7 ¹³	61.82 ²⁶	47.0 ²²	11.06 ¹⁴	34.8 ⁹
30.5	55.94 ⁸	67.2 ³⁹	53.40 ¹¹	34.2 ¹⁵	61.98 ¹⁵	49.5 ²⁵	11.15 ⁹	34.1 ⁷
4. 9.5	55.94 ⁸	67.2 ³⁶	53.40 ⁴	34.2 ¹⁷	61.98 ³	49.5 ²⁶	11.15 ⁴	34.1 ⁵
19.5	55.86 ¹⁵	70.8 ³³	53.44 ³	35.9 ¹⁷	62.01 ⁸	52.1 ¹	11.19 ¹	33.6 ²
1. 1.4	55.71 ²²	74.1 ³⁰	53.41 ⁹	37.6 ¹⁷	61.93 ¹⁹	54.6 ²⁵	11.18 ⁵	33.4 ¹
11.4	55.49 ²⁷	77.1 ²⁶	53.32 ¹⁴	39.3 ¹⁶	61.74 ²⁸	57.0 ²⁴	11.13 ⁸	33.3 ¹
21.4	55.22 ³²	79.7 ²²	53.18 ¹⁹	40.9 ¹⁴	61.46 ³⁶	59.1 ¹⁸	11.05 ¹¹	33.4 ²
31.4	54.90 ³⁵	81.9 ¹⁷	52.99 ²¹	42.3 ¹¹	61.10 ⁴¹	60.9 ¹⁴	10.94 ¹³	33.6 ³
10.3	54.55 ³⁶	83.6 ¹²	52.78 ²²	43.4 ⁸	60.69 ⁴⁵	62.3 ¹⁰	10.81 ¹⁴	33.9 ⁴
20.3	54.19 ³⁷	84.8 ⁷	52.56 ²³	44.2 ⁵	60.24 ⁴⁵	63.3 ⁵	10.67 ¹⁴	34.3 ³
30.3	53.82 ³⁷	85.5 ²	52.33 ²²	44.7 ²	59.79 ⁴⁵	63.8 ⁰	10.53 ¹³	34.6 ⁵
10.2	53.45 ³⁵	85.7 ³	52.11 ¹⁹	44.9 ¹	59.34 ⁴²	63.8 ⁵	10.40 ¹⁰	35.1 ⁴
20.2	53.10 ³²	85.4 ⁹	51.92 ¹⁷	44.8 ⁵	58.92 ³⁷	63.3 ¹⁰	10.29 ¹⁰	35.5 ⁴
30.2	52.78 ³⁰	84.5 ¹³	51.75 ¹⁴	44.3 ⁸	58.55 ³²	62.3 ¹⁴	10.19 ⁸	35.9 ⁴
1. 9.2	52.48 ²⁵	83.2 ¹⁸	51.61 ¹⁰	43.5 ¹¹	58.23 ²⁵	60.9 ¹⁸	10.11 ⁵	36.3 ³
19.1	52.23 ²¹	81.4 ²⁵	51.51 ⁵	42.4 ¹⁴	57.98 ¹⁸	59.1 ²¹	10.06 ²	36.6 ³
29.1	52.02 ¹⁵	79.3 ²¹	51.46 ³	41.0 ¹⁵	57.80 ¹⁰	57.0 ²⁶	10.04 ³	36.9 ²
11. 9.1	51.87 ¹⁰	76.8 ²⁸	51.45 ³	39.5 ¹⁸	57.70 ¹	54.5 ²⁶	10.04 ³	37.2 ²
19.1	51.77 ⁴	74.0 ²⁹	51.48 ⁸	37.7 ¹⁹	57.69 ⁶	51.9 ²⁹	10.07 ⁶	37.4 ²
29.0	51.73 ³	71.1 ²⁹	51.56 ¹³	35.8 ²⁰	57.75 ¹⁵	49.0 ²⁹	10.13 ⁹	37.6 ⁰
10. 8.0	51.76 ¹⁰	68.2 ³⁰	51.69 ¹⁶	33.8 ²²	57.90 ²²	46.1 ³⁰	10.22 ¹²	37.6 ¹
18.0	51.86 ¹⁶	65.2 ²⁸	51.85 ²¹	31.6 ²²	58.12 ³¹	43.1 ³⁰	10.34 ¹⁴	37.5 ²
27.9	52.02 ²³	62.4 ²⁶	52.06 ²⁵	29.4 ²²	58.43 ³⁸	40.1 ³⁰	10.48 ¹⁸	37.3 ⁴
6.9	52.25 ²⁹	59.8 ²²	52.31 ²⁸	27.2 ²¹	58.81 ⁴⁵	37.1 ²⁹	10.66 ²⁰	36.9 ⁶
16.9	52.54 ³⁵	57.6 ¹⁸	52.59 ³²	25.1 ²²	59.26 ⁵²	34.2 ²⁷	10.86 ²³	36.3 ⁸
26.9	52.89 ⁴¹	55.8 ¹³	52.91 ³⁶	22.9 ²¹	59.78 ⁵⁸	31.5 ²⁴	11.09 ²⁵	35.5 ⁹
1. 6.8	53.30 ⁴⁵	54.5 ⁷	53.27 ³⁹	20.8 ¹⁹	60.36 ⁶³	29.1 ¹⁸	11.34 ²⁸	34.6 ¹²
16.8	53.75 ⁴⁸	53.8 ¹	53.66 ⁴²	18.9 ¹⁸	60.99 ⁶⁸	26.9 ¹⁸	11.62 ³⁰	33.4 ¹⁴
26.8	54.23 ⁵⁰	53.7 ⁶	54.08 ⁴³	17.1 ¹⁵	61.67 ⁷¹	25.1 ¹⁵	11.92 ³²	32.0 ¹⁵
1. 5.8	54.73 ⁵⁰	54.3 ¹³	54.51 ⁴⁵	15.6 ¹³	62.38 ⁷³	23.6 ¹⁰	12.24 ³³	30.5 ¹⁷
15.7	55.23 ⁴⁹	55.6 ¹⁸	54.96 ⁴⁶	14.3 ¹⁰	63.11 ⁷³	22.6 ⁶	12.57 ³³	28.8 ¹⁸
25.7	55.72 ⁴⁷	57.4 ²⁵	55.42 ⁴⁴	13.3 ⁶	63.84 ⁷¹	22.0 ¹	12.90 ³³	27.0 ¹⁷
1. 5.7	56.19 ⁴³	59.9 ²⁹	55.86 ⁴³	12.7 ³	64.55 ⁶⁸	21.9 ⁴	13.23 ³²	25.3 ¹⁷
15.6	56.62 ³⁷	62.8 ³³	56.29 ³⁹	12.4 ²	65.23 ⁶³	22.3 ¹⁰	13.55 ²⁹	23.6 ¹⁶
25.6	56.99 ³⁰	66.1 ³⁶	56.68 ³⁵	12.6 ⁵	65.86 ⁵⁵	23.3 ¹³	13.84 ²⁶	22.0 ¹⁴
35.6	57.29 ³⁰	69.7 ³⁶	57.03 ³⁵	13.1 ⁵	66.41 ⁵⁵	24.6 ¹³	14.10 ²⁶	20.6 ¹⁴
δ , Tan δ an Place	1.936 53°.563	-1.658 63°'.91	1.480 49°.777	+1.091 36°'.53	2.610 56°.001	+2.412 50°'.38	1.019 8°.719	+0.195 39°'.25
δ , D_{ω} α	-0.03	-0.08	+0.02	+0.05	+0.04	+0.12	0.00	+0.01
δ , D_{ω} δ	-0.3	+0.7	-0.3	+0.7	-0.3	+0.7	-0.3	+0.7

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	λ Argus. Mag. 2.2		θ Hydræ. Mag. 3.8		β Argus. Mag. 1.8		83 Cancri. Mag. 6.6	
	Right Ascension.	Declination S.	Right Ascension.	Declination N.	Right Ascension.	Declination S.	Right Ascension.	Declination N.
	h m 9 4	° ' -43 5	h m 9 9	° ' + 2 40	h m 9 12	° ' -69 21	h m 9 14	° ' +18 3
	s 9 4	" "	s 9 9	" "	s 9 12	" "	s 9 14	" "
Jan. 0.6	53.69 ²⁴	11.0 ³⁵	58.26 ²⁴	25.0 ¹⁸	18.49 ³⁵	47.4 ³⁷	16.26 ²⁵	55.5 ¹⁰
10.6	53.93 ¹⁷	14.5 ³⁶	58.50 ¹⁹	23.2 ¹⁶	18.84 ²⁴	51.1 ³⁹	16.51 ²¹	54.5 ⁸
20.6	54.10 ¹²	18.1 ³⁵	58.69 ¹⁴	21.6 ¹⁴	19.08 ¹²	55.0 ⁴⁰	16.72 ¹⁶	53.7 ⁵
30.5	54.22 ⁵	21.6 ³⁴	58.83 ¹⁰	20.2 ¹²	19.20 ¹¹	59.0 ³⁸	16.88 ⁵	53.3 ²
Feb. 9.5	54.27 ¹	25.0 ³³	58.93 ⁴	19.0 ¹⁰	19.21 ¹¹	62.9 ³⁸	16.99 ⁵	53.0 ⁰
19.5	54.26 ⁷	28.3 ³⁰	58.97 ⁰	18.0 ⁷	19.10 ²²	66.7 ³⁶	17.04 ¹	53.0 ¹
Mar. 1.4	54.19 ¹¹	31.3 ²⁶	58.97 ⁵	17.3 ⁵	18.88 ³¹	70.3 ³⁴	17.05 ⁴	53.1 ⁴
11.4	54.08 ¹⁶	33.9 ²³	58.92 ⁸	16.8 ³	18.57 ³⁹	73.7 ³⁰	17.01 ⁸	53.5 ⁴
21.4	53.92 ²¹	36.2 ¹⁸	58.84 ¹¹	16.5 ⁰	18.18 ⁵²	76.7 ²⁶	16.93 ¹¹	53.9 ⁵
31.4	53.73 ¹⁴	38.0 ¹⁴	58.73 ¹²	16.3 ⁰	17.72 ⁴⁶	79.3 ²¹	16.82 ¹³	54.4 ⁵
Apr. 10.3	53.52 ²³	39.4 ¹⁰	58.61 ¹³	16.3 ²	17.20 ⁵⁵	81.4 ¹⁶	16.69 ¹⁴	54.9 ⁵
20.3	53.29 ²³	40.4 ⁵	58.48 ¹³	16.5 ³	16.65 ⁵⁷	83.0 ¹¹	16.55 ¹⁴	55.4 ⁵
30.3	53.06 ²³	40.9 ¹	58.35 ¹³	16.8 ³	16.09 ⁵⁶	84.1 ⁶	16.41 ¹⁴	55.9 ⁴
May 10.3	52.83 ²¹	41.0 ⁴	58.22 ¹²	17.1 ⁵	15.52 ⁵⁷	84.7 ¹	16.27 ¹²	56.3 ⁴
20.2	52.62 ²⁰	40.6 ⁸	58.10 ¹⁰	17.6 ⁵	14.95 ⁵⁴	84.8 ⁵	16.15 ¹¹	56.7 ³
30.2	52.42 ¹⁷	39.8 ¹³	58.00 ⁸	18.1 ⁶	14.41 ⁵⁰	84.3 ¹⁰	16.04 ⁸	57.0 ²
June 9.2	52.25 ¹⁴	38.5 ¹⁶	57.92 ⁶	18.7 ⁷	13.91 ⁴⁵	83.3 ¹⁵	15.96 ⁶	57.2 ¹
19.1	52.11 ¹²	36.9 ²⁰	57.86 ³	19.4 ⁶	13.46 ³⁹	81.8 ²⁰	15.90 ⁰	57.3 ⁰
29.1	51.99 ⁷	34.9 ²²	57.83 ⁰	20.0 ⁷	13.07 ³²	79.8 ²⁶	15.87 ²	57.3 ¹
July 9.1	51.92 ⁴	32.7 ²⁴	57.83 ²	20.7 ⁶	12.75 ²⁴	77.5 ²³	15.87 ²	57.3 ¹
19.1	51.88 ⁰	30.3 ²⁶	57.85 ⁵	21.3 ⁶	12.51 ¹⁵	74.9 ²⁹	15.89 ⁵	57.1 ³
29.0	51.88 ⁵	27.7 ²⁶	57.90 ⁸	21.9 ⁵	12.36 ⁵	72.0 ³⁰	15.94 ⁸	56.8 ⁴
Aug. 8.0	51.93 ⁸	25.1 ²⁶	57.98 ¹⁰	22.4 ⁴	12.31 ¹⁵	69.0 ³¹	16.02 ¹¹	56.4 ⁵
18.0	52.01 ¹³	22.5 ²⁴	58.08 ¹⁴	22.8 ¹	12.36 ¹⁵	65.9 ²⁸	16.13 ¹⁴	55.9 ⁷
28.0	52.14 ¹⁸	20.1 ²²	58.22 ¹⁶	23.0 ¹	12.51 ²⁶	62.9 ²⁸	16.27 ¹⁷	55.2 ⁸
Sept. 6.9	52.32 ²²	17.9 ¹⁸	58.38 ¹⁹	23.1 ²	12.77 ³⁵	60.1 ²⁵	16.44 ²⁰	54.4 ¹⁰
16.9	52.54 ²⁶	16.1 ¹⁵	58.57 ²²	22.9 ⁵	13.12 ⁴⁵	57.6 ²²	16.64 ²³	53.4 ¹¹
26.9	52.80 ³¹	14.6 ⁹	58.79 ²⁵	22.4 ⁷	13.57 ⁵⁴	55.4 ¹⁶	16.87 ²⁵	52.3 ¹⁴
Oct. 6.8	53.11 ³³	13.7 ⁴	59.04 ²⁷	21.7 ¹⁰	14.11 ⁶⁰	53.8 ¹¹	17.12 ²⁸	50.9 ¹⁴
16.8	53.44 ³⁶	13.3 ¹	59.31 ²⁹	20.7 ¹²	14.71 ⁶⁵	52.7 ⁵	17.40 ³¹	49.5 ¹⁶
26.8	53.80 ³⁹	13.4 ⁸	59.60 ³¹	19.5 ¹⁵	15.36 ⁶⁹	52.2 ²	17.71 ³²	47.9 ¹⁶
Nov. 5.8	54.19 ³⁹	14.2 ¹⁴	59.91 ³²	18.0 ¹⁷	16.05 ⁷⁰	52.4 ⁸	18.03 ³⁴	46.3 ¹⁷
15.7	54.58 ³⁹	15.6 ¹⁹	60.23 ³³	16.3 ¹⁸	16.75 ⁶⁹	53.2 ¹⁶	18.37 ³⁴	44.6 ¹⁷
25.7	54.97 ³⁷	17.5 ²⁴	60.56 ³²	14.5 ²⁰	17.44 ⁶⁵	54.8 ²¹	18.71 ³⁴	42.9 ¹⁶
Dec. 5.7	55.34 ³⁵	19.9 ²⁹	60.88 ³²	12.5 ²⁰	18.09 ⁶⁰	56.9 ²⁷	19.05 ³³	41.3 ¹⁵
15.6	55.69 ³²	22.8 ³¹	61.20 ²⁹	10.5 ²⁰	18.69 ⁵¹	59.6 ³¹	19.38 ³¹	39.8 ¹⁴
25.6	56.01 ²⁷	25.9 ³⁵	61.49 ²⁵	8.5 ¹⁸	19.20 ⁴²	62.7 ³⁵	19.69 ²⁸	38.4 ¹¹
35.6	56.28 ²⁷	29.4 ³⁵	61.74 ²⁵	6.7 ¹⁸	19.62 ³⁵	66.2 ³⁵	19.97 ²⁸	37.3 ¹¹
Sec δ , Tan δ	1.369	-0.935	1.001	+0.047	2.838	-2.656	1.052	+0.326
Mean Place	52°.138	20''.84	56°.613	24''.73	16°.325	61''.19	14°.425	58''.66
$D'\psi a, D_{\omega} a$	-0.02	-0.04	0.00	0.00	-0.05	-0.13	+0.01	+0.02
$D\psi \delta, D_{\omega} \delta$	-0.3	+0.7	-0.3	+0.7	-0.3	+0.7	-0.3	+0.7

FOR THE UPPER TRANSIT AT WASHINGTON.

1 Argus. Mag. 2.2		40 Lynceis. Mag. 3.3		θ Pyxidis. Mag. 4.9		α Hydræ. Mag. 2.2	
Right Ascension.	Declina- tion S.	Right Ascension.	Declina- tion N.	Right Ascension.	Declina- tion S.	Right Ascension.	Declina- tion S.
h m 9 14	° ' -58 54	h m 9 15	° ' +34 44	h m 9 17	° ' -25 36	h m 9 23	° ' - 8 17
s 50.50	" 28	s 55.07	" 29	s 45.03	" 24	s 26.16	" 20.0
50.78	52.9	55.36	63.1	45.27	6.4	26.40	22.3
50.99	56.6	55.60	63.0	45.46	9.4	26.60	22.3
51.12	60.4	55.78	63.3	45.59	12.4	26.75	24.6
51.16	64.3	55.90	63.8	45.68	15.3	26.85	26.6
51.13	68.1	55.96	64.6	45.71	18.1	26.90	28.5
51.01	71.8	55.96	65.5	45.69	20.7	26.90	30.1
50.83	75.3	55.91	66.7	45.63	23.0	26.90	31.5
50.59	78.5	55.82	67.9	45.53	25.0	26.86	32.7
50.30	81.3	55.69	69.1	45.41	26.6	26.79	33.5
49.98	83.7	55.54	70.2	45.26	27.9	26.69	34.1
49.63	85.6	55.37	71.2	45.10	28.9	26.57	34.5
49.28	87.1	55.20	72.0	44.94	29.6	26.44	34.7
48.92	88.1	55.03	72.7	44.78	29.8	26.30	34.6
48.57	88.5	54.88	73.1	44.63	29.8	26.17	34.3
48.24	88.4	54.74	73.3	44.49	29.3	26.05	33.9
47.94	87.8	54.63	73.2	44.38	28.6	25.94	33.3
47.67	86.7	54.55	73.0	44.29	27.6	25.85	32.5
47.44	85.2	54.51	72.5	44.22	26.3	25.78	31.5
47.26	83.2	54.49	71.8	44.18	24.7	25.73	30.5
47.14	80.9	54.51	70.9	44.17	23.0	25.71	29.4
47.07	78.3	54.56	69.8	44.18	21.1	25.71	28.3
47.06	75.5	54.65	68.6	44.23	19.2	25.74	27.1
47.12	72.6	54.78	67.2	44.32	17.3	25.80	26.0
47.25	69.7	54.93	65.7	44.44	15.4	25.89	25.0
47.45	66.8	55.12	64.1	44.59	13.7	26.01	24.2
47.71	64.1	55.34	62.4	44.77	12.2	26.15	23.6
48.04	61.8	55.60	60.6	44.99	10.9	26.33	23.2
48.42	59.8	55.88	58.7	45.24	10.1	26.53	23.1
48.86	58.4	56.20	56.9	45.52	9.7	26.77	23.4
49.33	57.5	56.54	55.0	45.83	9.7	27.03	24.0
49.83	57.2	56.91	53.1	46.16	10.2	27.32	25.0
50.34	57.5	57.29	51.4	46.50	11.3	27.63	26.3
50.85	58.5	57.68	49.8	46.84	12.7	27.95	27.9
51.33	60.2	58.06	48.3	47.18	14.7	28.28	29.8
51.78	62.4	58.43	47.1	47.50	17.0	28.60	32.0
52.18	65.2	58.78	46.2	47.80	19.6	28.92	34.2
52.52	68.4	59.10	45.6	48.06	22.4	29.21	36.6
	71.9		45.3		25.4	29.47	39.0
1.937	-1.659	1.217	+0.694	1.109	-0.479	1.011	-0.146
48°.782	65''.45	52°.878	69''.62	43°.581	12''.89	24°.653	22''.41
-0.03	-0.08	+0.01	+0.03	-0.01	-0.02	0.00	-0.01
-0.3	+0.7	-0.3	+0.7	-0.3	+0.7	-0.3	+0.6

[Eph 15]

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	<i>h</i> Ursæ Majoris. Mag. 3.8		<i>d</i> Ursæ Majoris. Mag. 4.6		θ Ursæ Majoris. Mag. 3.3		ϕ Argus. Mag. 3.6	
	Right Ascension.	Declination N.	Right Ascension.	Declination N.	Right Ascension.	Declination N.	Right Ascension.	Declination S.
	<i>h m</i> 9 24	<i>° '</i> +63 25	<i>h m</i> 9 26	<i>° '</i> +70 11	<i>h m</i> 9 27	<i>° '</i> +52 3	<i>h m</i> 9 27	<i>° '</i> -40 5
	<i>s</i>	<i>"</i>	<i>s</i>	<i>"</i>	<i>s</i>	<i>"</i>	<i>s</i>	<i>"</i>
Jan. 0.6	54.53	52.4	64.45	65.6	13.72	45.6	22.38	30.5
10.6	55.01 ⁴⁸	53.7 ¹³	65.05 ⁶⁰	67.1 ¹⁵	14.09 ³⁷	46.3 ⁷	22.64 ²⁶	33.9 ³⁴
20.6	55.40 ³⁹	55.4 ¹⁷	65.54 ⁴⁹	69.1 ²⁰	14.40 ³¹	47.4 ¹¹	22.84 ²⁰	37.3 ³⁴
30.5	55.69 ²⁹	57.4 ²⁰	65.90 ³⁶	71.4 ²³	14.64 ²⁴	48.8 ¹⁴	22.99 ¹⁵	40.8 ³⁵
Feb. 9.5	55.88 ¹⁹	59.7 ²³	66.13 ²³	73.9 ²⁵	14.79 ¹⁵	50.5 ¹⁷	23.07 ⁸	44.2 ³⁴
	9	24	9	26	8	19	3	32
19.5	55.97	62.1	66.22	76.5	14.87	52.4	23.10	47.4
Mar. 1.5	55.95	64.5 ²⁴	66.18 ⁴	79.2 ²⁷	14.87	54.4 ²⁰	23.07 ³	50.4 ³⁰
11.4	55.84 ¹¹	66.9 ²⁴	66.02 ¹⁶	81.8 ²⁶	14.81 ⁶	56.4 ²⁰	22.99 ⁸	53.0 ²⁶
21.4	55.64 ²⁰	69.1 ²²	65.74 ²⁸	84.2 ²⁴	14.68 ¹³	58.3 ¹⁹	22.87 ¹²	55.4 ²⁴
31.4	55.37 ²⁷	71.1 ²⁰	65.37 ³⁷	86.3 ²¹	14.50 ¹⁸	60.0 ¹⁷	22.71 ¹⁶	57.3 ¹⁹
	32	16	45	16	22	14	18	15
Apr. 10.3	55.05	72.7	64.92	87.9	14.28	61.4	22.53	58.8
20.3	54.69 ³⁶	73.9 ¹²	64.43 ⁴⁹	89.2 ¹³	14.04 ²⁴	62.6 ¹²	22.34 ¹⁹	59.9 ¹¹
30.3	54.32 ³⁷	74.6 ⁷	63.92 ⁵¹	90.0 ⁸	13.79 ²⁵	63.4 ⁸	22.13 ²¹	60.6 ⁷
May 10.3	53.95 ³⁷	74.9 ³	63.40 ⁵²	90.2 ²	13.54 ²⁵	63.8 ⁴	21.93 ²⁰	60.9 ³
20.2	53.59 ³⁶	74.8 ¹	62.90 ⁵⁰	89.9 ³	13.30 ²⁴	63.8 ⁰	21.73 ²⁰	60.7 ²
	33	6	46	7	22	3	19	6
30.2	53.26	74.2	62.44	89.2	13.08	63.5	21.54	60.1
June 9.2	52.98 ²⁸	73.1 ¹¹	62.03 ⁴¹	87.9 ¹³	12.90 ¹⁸	62.7 ⁸	21.38 ¹⁶	59.0 ¹¹
19.2	52.75 ²³	71.6 ¹⁵	61.68 ³⁵	86.3 ¹⁶	12.75 ¹¹	61.7 ¹⁰	21.24 ¹⁴	57.6 ¹⁷
29.1	52.57 ¹⁸	69.8 ¹⁸	61.41 ²⁷	84.2 ²¹	12.64 ¹¹	60.3 ¹⁴	21.12 ¹²	55.9 ¹⁴
July 9.1	52.46 ¹¹	67.6 ²²	61.22 ¹⁹	81.8 ²⁴	12.57 ⁷	58.6 ¹⁷	21.03 ⁹	53.9 ²⁰
	4	24	10	27	1	19	5	22
19.1	52.42	65.2	61.12	79.1	12.56	56.7	20.98	51.7
29.0	52.44 ²	62.5 ²⁷	61.11 ¹	76.2 ²⁹	12.59 ³	54.5 ²²	20.97 ¹	49.3 ²⁴
Aug. 8.0	52.52 ⁸	59.7 ²⁸	61.19 ⁸	73.1 ³¹	12.67 ⁸	52.2 ²³	20.99 ²	46.8 ²⁵
18.0	52.68 ¹⁶	56.8 ²⁹	61.37 ¹⁸	70.0 ³¹	12.79 ¹²	49.7 ²⁵	21.05 ⁶	44.4 ²⁴
28.0	52.90 ²²	53.8 ³⁰	61.63 ²⁶	66.8 ³²	12.96 ¹⁷	47.2 ²⁵	21.16 ¹¹	42.1 ²³
	29	29	35	32	22	26	14	22
Sept. 6.9	53.19	50.9	61.98	63.6	13.18	44.6	21.30	39.9
16.9	53.54 ³⁵	47.9 ³⁰	62.42 ⁴⁴	60.5 ³¹	13.44 ²⁶	42.0 ²⁶	21.49 ¹⁹	38.1 ¹⁵
26.9	53.95 ⁴¹	45.1 ²⁸	62.93 ⁵¹	57.5 ³⁰	13.75 ³¹	39.5 ²⁵	21.73 ²⁴	36.6 ¹⁰
Oct. 6.9	54.41 ⁴⁶	42.5 ²⁶	63.53 ⁶⁰	54.7 ²⁸	14.10 ³⁵	37.0 ²⁵	22.00 ²⁷	35.6 ⁵
16.8	54.93 ⁵²	40.1 ²⁴	64.19 ⁶⁶	52.2 ²⁵	14.49 ³⁹	34.7 ²³	22.31 ³¹	35.1 ¹
	56	22	71	21	42	22	34	
26.8	55.49	37.9	64.90	50.1	14.91	32.5	22.65	35.2
Nov. 5.8	56.09 ⁶⁰	36.1 ¹⁸	65.67 ⁷⁷	48.3 ¹⁸	15.36 ⁴⁵	30.6 ¹⁹	23.02 ³⁷	35.8 ¹²
15.7	56.72 ⁶³	34.7 ¹⁴	66.47 ⁸⁰	46.9 ¹⁴	15.84 ⁴⁸	29.1 ¹⁵	23.40 ³⁸	37.0 ¹⁸
25.7	57.36 ⁶⁴	33.7 ¹⁰	67.28 ⁸⁰	46.1 ⁸	16.33 ⁴⁹	27.8 ¹³	23.78 ³⁸	38.8 ²²
Dec. 5.7	57.99 ⁶³	33.2 ⁵	68.08 ⁸⁰	45.7 ⁴	16.81 ⁴⁸	26.9 ⁹	24.16 ³⁸	41.0 ²⁷
	62	0	77	2	47	4	36	
15.7	58.61	33.2	68.85	45.9	17.28	26.5	24.52	43.7
25.6	59.18 ⁵⁷	33.7 ⁵	69.58 ⁷³	46.6 ⁷	17.72 ⁴⁴	26.5 ⁰	24.85 ³³	46.8 ³¹
35.6	59.69 ⁵¹	34.7 ¹⁰	70.22 ⁶⁴	47.9 ¹³	18.12 ⁴⁰	26.9 ⁴	25.13 ²⁸	50.0 ³²
Sec δ , Tan δ	2.235	+2.000	2.953	+2.778	1.627	+1.283	1.307	-0.842
Mean Place	50°.659	63°'.55	59°.460	77°'.40	10°.855	55°'.70	20°.963	40°'.03
D' ψ α , D μ α	+0.03	+0.10	+0.05	+0.15	+0.02	+0.07	-0.01	-0.04
D ψ δ , D μ δ	-0.3	+0.6	-0.3	+0.6	-0.3	+0.6	-0.3	+0.6

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	ξ Leonis. Mag. 5.1		10 Leonis Minoris. Mag. 4.6		ζ Chamæleonis. Mag. 5.2		ο Leonis. Mag. 3.8	
	Right Ascension.	Declination N.	Right Ascension.	Declination N.	Right Ascension.	Declination S.	Right Ascension.	Declination N.
	h m 9 27	° ' " + 11 40	h m 9 29	° ' " + 36 46	h m 9 36	° ' " - 80 33	h m 9 36	° ' " + 10 16
	s 23.66	" 34.1	s 3.48	" 24.4	s 28.84	" 19.0	s 38.59	" 44.2
an. 0.6	23.66 ²⁶	34.1 ¹⁴	3.48 ³⁰	24.4 ⁰	28.84 ⁷⁶	19.0 ³⁴	38.59 ²⁶	44.2 ¹⁴
10.6	23.92 ²¹	32.7 ¹²	3.78 ²⁶	24.4 ³	29.60 ⁵³	22.4 ³⁷	38.85 ²²	42.8 ¹³
20.6	24.13 ¹⁷	31.5 ⁹	4.04 ²⁰	24.7 ⁶	30.13 ²⁹	26.1 ³⁹	39.07 ¹⁸	41.5 ¹⁰
30.5	24.30 ¹²	30.6 ⁶	4.24 ⁸	25.3 ¹¹	30.42 ¹⁸	30.0 ³⁹	39.25 ⁸	40.5 ⁶
eb. 9.5	24.42 ⁶	30.0 ⁵	4.38 ⁸	26.1 ¹¹	30.48 ³⁹	34.0 ³⁹	39.37 ⁸	39.7 ⁶
19.5	24.48 ²	29.5 ²	4.46 ²	27.2 ¹³	30.30 ⁴⁰	37.9 ³⁸	39.45 ²	39.1 ³
ar. 1.5	24.50 ³	29.3 ⁰	4.48 ⁴	28.5 ¹³	29.90 ⁶⁰	41.7 ³⁷	39.47 ⁶	38.8 ¹
11.4	24.47 ⁷	29.3 ¹	4.44 ⁹	29.8 ¹³	29.30 ⁷⁹	45.4 ³³	39.45 ⁸	38.7 ²
21.4	24.40 ¹²	29.4 ³	4.35 ¹⁵	31.1 ¹¹	28.51 ¹⁰⁷	48.7 ²⁶	39.39 ¹¹	38.8 ³
31.4	24.31 ¹³	29.7 ⁴	4.23 ¹⁷	32.4 ¹⁰	27.57 ¹¹⁸	51.7 ²¹	39.31 ¹³	39.0 ⁴
or. 10.3	24.19 ¹³	30.0 ⁴	4.08 ¹⁷	33.5 ⁷	26.50 ¹²⁴	54.3 ¹⁷	39.20 ¹²	39.3 ⁴
20.3	24.06 ¹³	30.4 ⁵	3.91 ¹⁷	34.5 ⁵	25.32 ¹²⁹	56.4 ¹²	39.07 ¹²	39.7 ⁴
30.3	23.93 ¹³	30.9 ⁴	3.74 ¹⁷	35.2 ³	24.08 ¹³⁰	58.1 ⁶	38.95 ¹¹	40.1 ⁵
ay 10.3	23.80 ¹²	31.3 ⁴	3.57 ¹⁶	35.7 ⁰	22.79 ¹²⁸	59.3 ⁰	38.82 ¹¹	40.6 ⁵
20.2	23.68 ¹⁰	31.7 ⁵	3.41 ¹⁵	36.0 ⁰	21.49 ¹²⁸	59.9 ⁰	38.70 ¹¹	41.0 ⁴
30.2	23.58 ⁹	32.2 ⁴	3.26 ¹²	36.0 ²	20.21 ¹²³	59.9 ⁵	38.59 ⁹	41.5 ⁴
ne 9.2	23.49 ⁶	32.6 ³	3.14 ⁹	35.8 ⁵	18.98 ¹¹⁵	59.4 ¹⁰	38.50 ⁷	41.9 ⁴
19.2	23.43 ⁴	32.9 ³	3.05 ⁶	35.3 ⁸	17.83 ¹⁰⁵	58.4 ¹⁵	38.43 ⁴	42.3 ⁴
29.1	23.39 ²	33.2 ²	2.99 ³	34.5 ¹⁰	16.78 ⁹¹	56.9 ¹⁹	38.39 ⁰	42.7 ²
ly 9.1	23.37 ¹	33.4 ²	2.96 ⁰	33.5 ¹¹	15.87 ⁷⁴	55.0 ²⁴	38.37 ⁰	42.9 ³
19.1	23.38 ⁴	33.6 ¹	2.96 ⁴	32.4 ¹³	15.13 ⁵⁵	52.6 ²⁶	38.37 ³	43.2 ¹
29.0	23.42 ⁷	33.7 ¹	3.00 ⁷	31.1 ¹⁵	14.58 ³⁵	50.0 ²⁹	38.40 ⁵	43.3 ⁰
ig. 8.0	23.49 ¹²	33.6 ²	3.07 ¹¹	29.6 ¹⁸	14.23 ¹⁷	47.1 ³⁰	38.45 ⁹	43.3 ¹
18.0	23.58 ¹²	33.4 ³	3.18 ¹⁴	27.9 ¹⁸	14.10 ¹⁰	44.1 ³⁰	38.54 ¹¹	43.2 ²
28.0	23.70 ¹⁵	33.1 ⁵	3.32 ¹⁸	26.1 ¹⁸	14.20 ³⁴	41.1 ³⁰	38.65 ¹⁴	43.0 ⁵
pt. 6.9	23.85 ¹⁸	32.6 ⁷	3.50 ²¹	24.3 ²⁰	14.54 ⁵⁷	38.1 ²⁸	38.79 ¹⁷	42.5 ⁶
16.9	24.03 ²¹	31.9 ⁹	3.71 ²⁵	22.3 ²⁰	15.11 ⁷⁸	35.3 ²⁴	38.96 ²⁰	41.9 ⁹
26.9	24.24 ²⁴	31.0 ¹¹	3.96 ²⁸	20.3 ²⁰	15.89 ⁹⁸	32.9 ²¹	39.16 ²³	41.0 ¹⁰
rt. 6.9	24.48 ²⁷	29.9 ¹³	4.24 ³²	18.3 ²¹	16.87 ¹¹⁵	30.8 ¹⁵	39.39 ²⁶	40.0 ¹³
16.8	24.75 ²⁹	28.6 ¹⁵	4.56 ³⁴	16.2 ¹⁹	18.02 ¹²⁷	29.3 ¹⁰	39.65 ²⁸	38.7 ¹⁵
26.8	25.04 ³¹	27.1 ¹⁶	4.90 ³⁷	14.3 ¹⁹	19.29 ¹³⁷	28.3 ⁴	39.93 ³¹	37.2 ¹⁶
ov. 5.8	25.35 ³²	25.5 ¹⁷	5.27 ³⁸	12.4 ¹⁸	20.66 ¹⁴¹	27.9 ³	40.24 ³³	35.6 ¹⁸
15.7	25.67 ³⁴	23.8 ¹⁹	5.65 ⁴⁰	10.6 ¹⁵	22.07 ¹³⁹	28.2 ¹⁶	40.57 ³³	33.8 ¹⁹
25.7	26.01 ³²	21.9 ¹⁸	6.05 ³⁸	9.1 ¹³	23.46 ¹²³	29.2 ²³	40.90 ³²	31.9 ¹⁸
ec. 5.7	26.35 ³²	20.1 ¹⁸	6.45 ³⁸	7.8 ⁹	24.80 ¹²³	30.8 ²³	41.24 ³²	30.0 ¹⁸
15.7	26.67 ³¹	18.3 ¹⁷	6.83 ³⁶	6.9 ⁷	26.03 ¹⁰⁸	33.1 ²⁷	41.56 ³¹	28.2 ¹⁸
25.6	26.98 ²⁸	16.6 ¹⁵	7.19 ³³	6.2 ³	27.11 ⁸⁹	35.8 ³²	41.87 ²⁹	26.4 ¹⁶
35.6	27.26 ²⁸	15.1 ¹⁵	7.52 ³³	5.9 ³	28.00 ⁸⁹	39.0 ³²	42.16 ²⁹	24.8 ¹⁶
δ, Tan δ	1.021	+0.207	1.248	+0.747	6.097	-6.015	1.016	+0.181
an Place	21°.973	36'' .59	1°.282	32'' .30	25°.656	34'' .39	36°.960	46'' .82
α, D _α α	0.00	+0.01	+0.01	+0.04	-0.09	-0.32	0.00	+0.01
δ, D _δ δ	-0.3	+0.6	-0.3	+0.6	-0.3	+0.6	-0.3	+0.6

FOR THE UPPER TRANSIT AT WASHINGTON

Mean Solar Date.	θ Antilæ. Mag. 5.0		ϵ Leonis. Mag. 3.1		ν Ursæ Majoris. Mag. 3.9		ν Argus. Mag. 3.2	
	Right Ascension.	Declination S.	Right Ascension.	Declination N.	Right Ascension.	Declination N.	Right Ascension.	Declination S.
	h m 9 40	° ' " - 27 22	h m 9 41	° ' " + 24 9	h m 9 44	° ' " + 59 25	h m 9 44	° ' " - 64 40
Jan. 0.6	26.08	40.7	3.60	51.9	60.74	68.6	60.27	25.3
10.6	26.33 ²⁵	43.7 ³⁰	3.89 ²⁹	51.1 ⁸	61.19 ⁴⁵	69.5 ⁹	60.65 ³⁸	28.9 ³⁶
20.6	26.55 ²²	46.8 ³¹	4.13 ²⁴	50.6 ⁵	61.58 ³⁹	70.9 ¹⁴	60.95 ³⁰	32.6 ³⁷
30.5	26.71 ¹⁶	49.8 ³⁰	4.32 ¹⁹	50.4 ²	61.88 ³⁰	72.6 ¹⁷	61.15 ²⁰	36.5 ³⁹
Feb. 9.5	26.82 ¹¹	52.7 ²⁹	4.46 ¹⁴	50.5 ¹	62.09 ²¹	74.6 ²⁰	61.26 ¹¹	40.5 ⁴⁰
19.5	26.88	55.4	4.55	50.8	62.20	76.8	61.27	44.4
Mar. 1.5	26.88	57.8	4.58	51.3	62.23	79.1	61.19	48.1
11.4	26.84	60.0	4.56	52.0	62.17	81.5	61.03	51.6
21.4	26.76	61.9	4.51	52.8	62.03	83.7	60.79	54.8
31.4	26.65 ¹¹	63.4 ¹⁵	4.41 ¹⁰	53.6 ⁸	61.82 ²¹	85.7 ²⁰	60.49 ³⁰	57.6 ²⁸
Apr. 10.4	26.52	64.5	4.29	54.5	61.57	87.4	60.14	60.1
20.3	26.37 ¹⁵	65.4 ⁹	4.16 ¹³	55.2 ⁷	61.28 ²⁹	88.8 ¹⁴	59.75 ³⁹	62.0 ¹⁹
30.3	26.22 ¹⁵	65.8 ⁴	4.02 ¹⁴	55.9 ⁷	60.97 ³¹	89.8 ¹⁰	59.33 ⁴²	63.5 ¹⁵
May 10.3	26.06 ¹⁶	65.9 ¹	3.87 ¹⁵	56.5 ⁶	60.65 ³²	90.4 ⁶	58.90 ⁴³	64.4 ⁹
20.2	25.91 ¹⁵	65.7 ²	3.74 ¹³	56.9 ⁴	60.34 ³¹	90.5 ¹	58.47 ⁴³	64.8 ⁴
30.2	25.77 ¹⁴	65.2 ⁵	3.62 ¹²	57.2 ³	60.06 ²⁸	90.2 ³	58.05 ⁴²	64.7 ¹
June 9.2	25.64 ¹³	64.3 ⁹	3.52 ¹⁰	57.3 ¹	59.80 ²⁶	89.4 ⁸	57.65 ⁴⁰	64.1 ⁶
19.2	25.54 ¹⁰	63.1 ¹²	3.44 ⁸	57.3 ⁰	59.58 ²²	88.3 ¹¹	57.28 ³⁷	63.0 ¹¹
29.1	25.45 ⁹	61.7 ¹⁴	3.39 ⁵	57.1 ²	59.41 ¹⁷	86.7 ¹⁶	56.95 ³³	61.4 ¹⁶
July 9.1	25.39 ⁶	60.0 ¹⁷	3.36 ³	56.8 ³	59.29 ¹²	84.8 ¹⁹	56.67 ²⁸	59.4 ²⁰
19.1	25.36	58.2	3.36	56.3	59.22	82.6	56.44	57.0
29.1	25.36	56.3	3.38	55.7	59.21	80.2	56.28	54.4
Aug. 8.0	25.38	54.4	3.44	54.9	59.25	77.6	56.20	51.5
18.0	25.44	52.5	3.53	54.0	59.35	74.8	56.19	48.5
28.0	25.53	50.7	3.65	52.9	59.51	71.9	56.26	45.6
Sept. 6.9	25.66	49.1	3.79	51.6	59.73	68.9	56.42	42.7
16.9	25.83	47.7	3.97	50.2	60.00	66.0	56.67	40.1
26.9	26.03	46.7	4.18	48.7	60.33	63.1	57.00	37.8
Oct. 6.9	26.27	46.1	4.42	47.0	60.71	60.3	57.40	35.9
16.8	26.54	46.0	4.69	45.3	61.15	57.7	57.88	34.6
26.8	26.84	46.3	4.99	43.4	61.63	55.3	58.41	33.8
Nov. 5.8	27.16	47.2	5.32	41.6	62.14	53.2	58.98	33.7
15.8	27.50	48.5	5.67	39.7	62.69	51.5	59.58	34.2
25.7	27.86	50.3	6.02	37.9	63.26	50.2	60.19	35.4
Dec. 5.7	28.21	52.5	6.38	36.3	63.83	49.3	60.78	37.2
15.7	28.54	55.0	6.73	34.8	64.39	48.9	61.34	39.6
25.6	28.86	57.8	7.07	33.5	64.92	49.0	61.85	42.6
35.6	29.14	60.8	7.37	32.6	65.40	49.5	62.28	45.9
Sec δ , Tan δ	1.126	-0.518	1.096	+0.449	1.967	+1.693	2.338	-2.114
Mean Place	24° 73.4	47' 43"	1° 77.1	58' 02"	57° 45.1	81' 17"	58° 68.8	39' 35"
D ψ α , D ω α	-0.01	-0.03	+0.01	+0.02	+0.02	+0.09	-0.03	-0.12
D ψ δ , D ω δ	-0.3	+0.6	-0.3	+0.6	-0.3	+0.6	-0.3	+0.6

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	6 Sextantis. Mag. 6.0		μ Leonis. Mag. 4.1		Groombridge 1586. Mag. 6.0		19 Leonis Minoris. Mag. 5.2	
	Right Ascension.	Declination S.	Right Ascension.	Declination N.	Right Ascension.	Declination N.	Right Ascension.	Declination N.
	h m 9 46	° ' " - 3 50	h m 9 47	° ' " + 26 24	h m 9 50	° ' " + 73 16	h m 9 52	° ' " + 41 27
Jan. 0.6	58.53 ²⁶	39.4 ²²	57.76 ³⁰	21.2 ⁷	54.22 ⁷⁴	49.5 ¹⁴	31.25 ³⁵	29.3 ⁰
10.6	58.79 ²²	41.6 ²⁰	58.06 ²⁵	20.5 ⁴	54.96 ⁶¹	50.9 ¹⁹	31.60 ²⁹	29.3 ⁴
20.6	59.01 ¹⁸	43.6 ¹⁹	58.31 ²⁰	20.1 ¹	55.57 ⁴⁸	52.8 ²²	31.89 ²⁴	29.7 ⁷
30.6	59.19 ¹²	45.5 ¹⁷	58.51 ¹⁵	20.0 ¹	56.05 ³³	55.0 ²⁶	32.13 ¹⁷	30.4 ¹¹
Feb. 9.5	59.31 ⁸	47.2 ¹⁴	58.66 ⁹	20.1 ⁵	56.38 ¹⁷	57.6 ²⁷	32.30 ¹¹	31.5 ¹³
19.5	59.39 ³	48.6 ¹²	58.75 ⁴	20.6 ⁷	56.55 ²	60.3 ²⁸	32.41 ⁵	32.8 ¹⁵
Mar. 1.5	59.42 ²	49.8 ⁹	58.79 ¹	21.3 ⁸	56.57 ¹⁴	63.1 ²⁸	32.46 ²	34.3 ¹⁶
11.4	59.40 ⁵	50.7 ⁷	58.78 ⁵	22.1 ⁹	56.43 ²⁷	65.9 ²⁶	32.44 ⁷	35.9 ¹⁶
21.4	59.35 ⁸	51.4 ⁴	58.73 ⁹	23.0 ⁹	56.16 ³⁹	68.5 ²³	32.37 ¹¹	37.5 ¹⁵
31.4	59.27 ¹⁰	51.8 ³	58.64 ¹²	23.9 ¹⁰	55.77 ⁴⁹	70.8 ¹⁹	32.26 ¹⁵	39.0 ¹⁵
Apr. 10.4	59.17 ¹¹	52.1 ⁰	58.52 ¹³	24.9 ⁸	55.28 ⁵⁶	72.7 ¹⁵	32.11 ¹⁷	40.5 ¹²
20.3	59.06 ¹³	52.1 ¹	58.39 ¹⁴	25.7 ⁸	54.72 ⁶⁰	74.2 ¹¹	31.94 ¹⁸	41.7 ¹⁰
30.3	58.93 ¹²	52.0 ³	58.25 ¹⁵	26.5 ⁶	54.12 ⁶³	75.3 ⁵	31.76 ¹⁹	42.7 ⁷
May 10.3	58.81 ¹²	51.7 ⁴	58.10 ¹⁴	27.1 ⁵	53.49 ⁶¹	75.8 ⁶	31.57 ¹⁸	43.4 ¹
20.2	58.69 ¹¹	51.3 ⁶	57.96 ¹²	27.6 ²	52.88 ⁵⁹	75.8 ⁶	31.39 ¹⁶	43.8 ¹
30.2	58.58 ⁹	50.7 ⁶	57.84 ¹¹	27.8 ¹	52.29 ⁵⁴	75.2 ¹¹	31.23 ¹⁵	43.9 ²
June 9.2	58.49 ⁸	50.1 ⁸	57.73 ⁸	27.9 ⁰	51.75 ⁴⁷	74.1 ¹⁵	31.08 ¹²	43.7 ⁵
19.2	58.41 ⁵	49.3 ⁸	57.65 ⁷	27.9 ³	51.28 ⁴⁰	72.6 ²⁰	30.96 ⁹	43.2 ⁹
29.1	58.36 ⁴	48.5 ⁸	57.58 ³	27.6 ⁴	50.88 ³¹	70.6 ²³	30.87 ⁶	42.3 ¹¹
July 9.1	58.32 ¹	47.7 ⁹	57.55 ¹	27.2 ⁶	50.57 ²¹	68.3 ²⁷	30.81 ³	41.2 ¹³
19.1	58.31 ²	46.8 ⁹	57.54 ²	26.6 ⁸	50.36 ¹¹	65.6 ²⁹	30.78 ⁰	39.9 ¹⁵
29.1	58.33 ⁴	45.9 ⁸	57.56 ⁵	25.8 ⁹	50.25 ⁰	62.7 ³²	30.78 ⁴	38.4 ¹⁸
Aug. 8.0	58.37 ⁶	45.1 ⁷	57.61 ⁸	24.9 ¹¹	50.25 ¹⁰	59.5 ³³	30.82 ⁸	36.6 ¹⁹
18.0	58.43 ¹⁰	44.4 ⁵	57.69 ¹¹	23.8 ¹²	50.35 ²¹	56.2 ³⁴	30.90 ¹²	34.7 ²¹
28.0	58.53 ¹²	43.9 ⁴	57.80 ¹⁴	22.6 ¹⁴	50.56 ³¹	52.8 ³⁴	31.02 ¹⁶	32.6 ²²
Sept. 6.9	58.65 ¹⁶	43.5 ¹	57.94 ¹⁷	21.2 ¹⁵	50.87 ⁴²	49.4 ³⁴	31.18 ¹⁹	30.4 ²³
16.9	58.81 ¹⁸	43.4 ²	58.11 ²⁰	19.7 ¹⁷	51.29 ⁵²	46.0 ³²	31.37 ²³	28.1 ²³
26.9	58.99 ²²	43.6 ⁴	58.31 ²⁴	18.0 ¹⁸	51.81 ⁶⁰	42.8 ³⁰	31.60 ²⁷	25.8 ²⁴
Oct. 6.9	59.21 ²⁵	44.0 ⁷	58.55 ²⁷	16.2 ¹⁹	52.43 ⁷²	39.8 ²⁸	31.87 ³¹	23.4 ²³
16.8	59.46 ²⁷	44.7 ¹¹	58.82 ³¹	14.3 ¹⁹	53.13 ⁷⁸	37.0 ²⁵	32.18 ³⁴	21.1 ²³
26.8	59.73 ³⁰	45.8 ¹⁴	59.13 ³²	12.4 ¹⁹	53.91 ⁸⁴	34.5 ²¹	32.52 ³⁷	18.8 ²¹
Nov. 5.8	60.03 ³²	47.2 ¹⁷	59.45 ³⁵	10.5 ¹⁹	54.75 ⁸⁹	32.4 ¹⁷	32.89 ⁴⁰	16.7 ¹⁹
15.8	60.35 ³³	48.9 ¹⁹	59.80 ³⁶	8.6 ¹⁸	55.64 ⁹²	30.7 ¹¹	33.29 ⁴²	14.8 ¹⁷
25.7	60.68 ³³	50.8 ²¹	60.16 ³⁶	6.8 ¹⁷	56.56 ⁹³	29.6 ⁶	33.71 ⁴²	13.1 ¹⁴
Dec. 5.7	61.01 ³³	52.9 ²²	60.52 ³⁶	5.1 ¹⁵	57.49 ⁹¹	29.0 ¹	34.13 ⁴¹	11.7 ¹¹
15.7	61.34 ³¹	55.1 ²²	60.88 ³⁴	3.6 ¹²	58.40 ⁸⁶	28.9 ⁵	34.54 ³⁹	10.6 ⁷
25.6	61.65 ²⁷	57.3 ²³	61.22 ³²	2.4 ⁹	59.26 ⁷⁸	29.4 ¹¹	34.93 ³⁷	9.9 ²
35.6	61.92 ²⁷	59.6 ²³	61.54 ³²	1.5 ⁹	60.04 ⁷⁸	30.5 ¹¹	35.30 ³⁷	9.7 ²
Sec δ , Tan δ	1.002	-0.067	1.117	+0.497	3.476	+3.329	1.334	+0.884
Mean Place	57°.087	40''.00	55°.921	28''.24	48°.739	63''.77	29°.029	39''.74
D' ψ α , D ₀ α	0.00	0.00	+0.01	+0.03	+0.05	+0.19	+0.01	+0.05
D' ψ δ , D ₀ δ	-0.3	+0.5	-0.3	+0.5	-0.3	+0.5	-0.3	+0.5

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	ϕ Argus. Mag. 3.7		π Leonis. Mag. 4.9		η Leonis. Mag. 3.6		α Leonis. (Regulus.) Mag. 1.3	
	Right Ascension.	Declination S.	Right Ascension.	Declination N.	Right Ascension.	Declination N.	Right Ascension.	Declination N.
	h m 9 53	° ' s -54 9	h m 9 55	° ' s + 8 26	h m 10 2	° ' s +17 10	h m 10 3	° ' s +12 22
Jan. 0.6	53.87 ^s	34.4 ^s	44.90 ^s	66.1 ^s	43.56 ^s	33.9 ^s	52.36 ^s	54.6 ^s
10.6	54.21 ³⁴	37.9 ³⁵	45.17 ²⁷	64.5 ¹⁶	43.85 ²⁹	32.6 ¹³	52.65 ²⁹	53.1 ¹⁵
20.6	54.47 ²⁶	41.5 ³⁶	45.41 ²⁴	63.0 ¹⁵	44.10 ²⁵	31.6 ¹⁰	52.89 ²⁴	51.9 ¹²
30.6	54.67 ²⁰	45.3 ³⁸	45.60 ¹⁹	61.8 ¹²	44.31 ¹⁵	30.9 ⁷	53.09 ²⁰	50.9 ¹⁰
Feb. 9.5	54.80 ¹³	49.1 ³⁸	45.74 ¹⁴	60.9 ⁹	44.46 ¹⁵	30.5 ⁴	53.24 ¹⁵	50.2 ⁷
19.5	54.85 ⁵	52.8 ³⁷	45.83 ⁹	60.2 ⁷	44.57 ¹¹	30.3 ²	53.35 ¹¹	49.7 ⁵
Mar. 1.5	54.83 ²	56.3 ³⁵	45.88 ⁵	59.8 ⁴	44.62 ⁵	30.4 ¹	53.40 ⁵	49.5 ²
11.4	54.75 ⁸	59.6 ³³	45.88 ⁰	59.6 ²	44.63 ¹	30.7 ³	53.41 ¹	49.5 ⁰
21.4	54.61 ¹⁴	62.6 ³⁰	45.84 ⁴	59.5 ¹	44.59 ⁴	31.2 ⁵	53.37 ⁵	49.7 ²
31.4	54.42 ¹⁹	65.2 ²⁶	45.77 ⁷	59.7 ²	44.52 ⁷	31.8 ⁶	53.31 ⁶	50.1 ⁴
Apr. 10.4	54.20 ²²	67.5 ²³	45.67 ¹⁰	59.9 ²	44.42 ¹⁰	32.4 ⁶	53.21 ¹⁰	50.5 ⁴
20.3	53.94 ²⁶	69.2 ¹⁷	45.56 ¹¹	60.3 ⁴	44.31 ¹¹	33.1 ⁷	53.10 ¹¹	51.0 ⁵
30.3	53.67 ²⁷	70.5 ¹³	45.44 ¹²	60.7 ⁴	44.19 ¹²	33.7 ⁶	52.98 ¹²	51.5 ⁵
May 10.3	53.39 ²⁸	71.4 ⁹	45.32 ¹²	61.2 ⁵	44.06 ¹³	34.3 ⁶	52.86 ¹²	52.1 ⁶
20.3	53.11 ²⁸	71.7 ³	45.20 ¹²	61.6 ⁴	43.94 ¹²	34.8 ⁵	52.74 ¹²	52.6 ⁵
30.2	52.83 ²⁸	71.5 ²	45.09 ¹¹	62.1 ⁵	43.82 ¹²	35.3 ⁵	52.63 ¹¹	53.1 ⁵
June 9.2	52.57 ²⁶	70.9 ⁶	45.00 ⁹	62.6 ⁵	43.72 ¹⁰	35.7 ⁴	52.53 ¹⁰	53.5 ⁴
19.2	52.33 ²⁴	69.8 ¹¹	44.92 ⁸	63.1 ⁵	43.64 ⁸	35.9 ²	52.45 ⁸	53.9 ⁴
29.1	52.12 ²¹	68.2 ¹⁶	44.86 ⁶	63.5 ⁴	43.58 ⁶	36.0 ¹	52.39 ⁶	54.2 ³
July 9.1	51.94 ¹⁸	66.3 ¹⁹	44.83 ³	63.9 ⁴	43.54 ⁴	36.0 ⁰	52.35 ¹	54.4 ²
19.1	51.80 ¹⁴	64.1 ²²	44.82 ¹	64.2 ³	43.52 ²	35.9 ¹	52.33 ²	54.5 ¹
29.1	51.71 ⁹	61.6 ²⁵	44.83 ¹	64.4 ²	43.53 ¹	35.7 ²	52.34 ¹	54.5 ⁰
Aug. 8.0	51.66 ⁵	58.9 ²⁷	44.86 ³	64.5 ¹	43.56 ³	35.3 ⁴	52.37 ⁴	54.4 ¹
18.0	51.67 ¹	56.1 ²⁸	44.93 ⁷	64.4 ¹	43.62 ⁶	34.7 ⁶	52.42 ⁵	54.1 ³
28.0	51.74 ⁷	53.4 ²⁷	45.02 ⁹	64.2 ²	43.71 ⁹	34.0 ⁷	52.51 ⁹	53.7 ⁴
Sept. 7.0	51.86 ¹²	50.7 ²⁷	45.14 ¹²	63.9 ³	43.83 ¹²	33.1 ⁹	52.62 ¹¹	53.1 ⁶
16.9	52.05 ¹⁹	48.3 ²⁴	45.29 ¹⁵	63.3 ⁶	43.98 ¹⁵	32.0 ¹¹	52.77 ¹⁵	52.3 ⁸
26.9	52.30 ²⁵	46.3 ²⁰	45.48 ¹⁹	62.5 ⁸	44.16 ¹⁸	30.8 ¹²	52.95 ¹⁸	51.2 ¹¹
Oct. 6.9	52.60 ³⁰	44.6 ¹⁷	45.69 ²¹	61.5 ¹⁰	44.37 ²¹	29.3 ¹⁵	53.16 ²¹	50.0 ¹²
16.8	52.96 ³⁶	43.5 ¹¹	45.93 ²⁴	60.3 ¹²	44.62 ²⁵	27.7 ¹⁶	53.40 ²⁴	48.6 ¹⁴
26.8	53.36 ⁴⁰	42.9 ⁶	46.21 ²⁸	58.8 ¹⁵	44.89 ²⁷	25.9 ¹⁸	53.67 ²⁷	46.9 ¹⁷
Nov. 5.8	53.80 ⁴⁴	42.9 ⁰	46.51 ³⁰	57.1 ¹⁷	45.20 ³¹	24.1 ¹⁸	53.96 ²⁹	45.2 ¹⁷
15.8	54.27 ⁴⁷	43.5 ⁶	46.83 ³²	55.3 ¹⁸	45.52 ³²	22.1 ²⁰	54.28 ³²	43.3 ¹⁹
25.7	54.74 ⁴⁷	44.8 ¹³	47.16 ³³	53.4 ¹⁹	45.86 ³⁴	20.2 ¹⁹	54.62 ³⁴	41.4 ²⁰
Dec. 5.7	55.21 ⁴⁷	46.7 ¹⁹	47.49 ³³	51.4 ²⁰	46.21 ³⁵	18.3 ¹⁹	54.96 ³⁴	39.4 ²⁰
15.7	55.66 ⁴⁵	49.1 ²⁴	47.82 ³³	49.4 ²⁰	46.56 ³⁵	16.5 ¹⁸	55.30 ³⁴	37.5 ¹⁸
25.7	56.08 ⁴²	52.0 ²⁹	48.14 ³²	47.5 ¹⁹	46.89 ³³	14.8 ¹⁷	55.62 ³²	35.7 ¹⁷
35.6	56.44 ³⁶	55.3 ³³	48.44 ³⁰	45.8 ¹⁷	47.20 ³¹	13.4 ¹⁴	55.92 ³⁰	34.0 ¹⁷
Sec δ , Tan δ	1.708	-1.385	1.011	+0.140	1.047	+0.309	1.024	+0.220
Mean Place	52°.556	46''.90	43°.375	69''.09	41°.951	39''.51	50°.825	59''.05
D' ϕ α , D α α	-0.02	-0.08	0.00	+0.01	0.00	+0.02	0.00	+0.01
D ϕ δ , D α δ	-0.3	+0.5	-0.3	+0.5	-0.3	+0.5	-0.3	+0.5

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	λ Hydræ. Mag. 3.8			γ Velorum. Mag. 4.1			32 Ursæ Majoris. Mag. 5.7			ζ Leonis. Mag. 3.6		
	Right Ascension.	Declina- tion S.		Right Ascension.	Declina- tion S.		Right Ascension.	Declina- tion N.		Right Ascension.	Declina- tion N.	
	h m 10 6	° ' " — 11 55		h m 10 11	° ' " — 41 41		h m 10 11	° ' " + 65 31		h m 10 11	° ' " + 23 50	
	s 10 6	" — 11 55		s 10 11	" — 41 41		s 10 11	" + 65 31		s 10 11	" + 23 50	
Jan. 0.6	27.94	58.2	11.01	51.7	56.34	43.1	59.63	21.0				
10.6	28.22 ²⁸	60.7 ²⁵	11.32 ³¹	54.9 ³²	56.91 ⁵⁷	44.0 ⁹	59.93 ³⁰	20.0 ¹⁰				
20.6	28.45 ²³	63.1 ²⁴	11.58 ²⁶	58.3 ³⁴	57.40 ⁴⁹	45.3 ¹³	60.20 ²⁷	19.3 ⁷				
30.6	28.64 ¹⁹	65.4 ²³	11.79 ²¹	61.8 ³⁵	57.80 ⁴⁰	47.1 ¹⁸	60.43 ²³	19.0 ³				
Feb. 9.5	28.79 ¹⁵	67.6 ²²	11.94 ¹⁵	65.2 ³⁴	58.10 ³⁰	49.3 ²²	60.60 ¹⁷	19.0 ⁰				
	9	19	9	33	19	24	11	2				
19.5	28.88	69.5	12.03	68.5	58.29	51.7	60.71	19.2				
Mar. 1.5	28.92	71.2 ¹⁷	12.06	71.7 ³²	58.37	54.3 ²⁶	60.78	19.7				
	1	14	3	29	3	26	1	7				
11.5	28.93	72.6 ¹²	12.03	74.6 ²⁷	58.34	56.9 ²⁵	60.79	20.4				
	4	12	6	27	13	25	3	8				
21.4	28.89	73.8	11.97	77.3 ²³	58.21 ²²	59.4 ²³	60.76	21.2				
	7	9	11	23	22	23	6	9				
31.4	28.82	74.7	11.86	79.6 ¹⁹	57.99 ²⁹	61.7 ²¹	60.70 ¹⁰	22.1				
	9	6	15	19	29	21	10	10				
Apr. 10.4	28.73	75.3	11.71	81.5	57.70	63.8	60.60	23.1				
	11	4	16	16	34	17	11	9				
20.3	28.62	75.7	11.55	83.1	57.36	65.5	60.49	24.0				
	12	1	18	11	38	13	13	8				
30.3	28.50	75.8	11.37	84.2	56.98	66.8	60.36	24.8				
May 10.3	28.37 ¹³	75.8	11.18	84.9	56.58	67.7	60.22	25.5				
	12	3	19	2	40	9	14	7				
20.3	28.25 ¹¹	75.5	10.99	85.1	56.18	68.1	60.09	26.1				
	11	5	19	1	39	2	12	6				
30.2	28.14	75.0	10.80	85.0	55.79	67.9	59.97	26.5				
June 9.2	28.04 ¹⁰	74.3	10.62	84.4	55.43	67.3	59.86	26.8				
	9	8	16	6	36	6	11	3				
19.2	27.95	73.5	10.46	83.4	55.11	66.2	59.77	26.9				
	9	10	15	10	32	11	9	1				
29.2	27.88	72.5	10.31	82.1	54.83	64.7	59.70	26.8				
	6	10	12	17	28	15	7	2				
July 9.1	27.82	71.5	10.19	80.4	54.61	62.8	59.65	26.6				
	3	12	10	20	17	23	3	4				
19.1	27.79	70.3	10.09	78.4	54.44	60.5	59.62	26.2				
	1	12	6	21	9	26	1	6				
29.1	27.78	69.1	10.03	76.3	54.35	57.9	59.61	25.6				
	2	11	3	23	3	28	1	8				
Aug. 8.0	27.80	68.0	10.00	74.0	54.32	55.1	59.64	24.8				
	4	11	1	24	4	31	5	10				
18.0	27.84	66.9	10.01	71.6	54.36	52.0	59.69	23.8				
	8	10	5	24	11	32	8	11				
28.0	27.92	65.9	10.06	69.2	54.47	48.8	59.77	22.7				
	10	8	10	22	18	32	11	13				
Sept. 7.0	28.02	65.1	10.16	67.0	54.65	45.6	59.88	21.4				
	14	6	14	20	26	33	15	15				
16.9	28.16	64.5	10.30	65.0	54.91	42.3	60.03	19.9				
	17	3	19	17	33	32	18	16				
26.9	28.33	64.2	10.49	63.3	55.24	39.1	60.21	18.3				
Oct. 6.9	28.53 ²⁰	64.3	10.73	62.0	55.64	35.9	60.42	16.5				
	20	1	24	13	40	32	21	18				
16.9	28.76 ²³	64.7	11.01	61.1	56.10	33.0	60.66	14.6				
	27	8	33	4	53	27	28	20				
26.8	29.03	65.5	11.34	60.7	56.63	30.3	60.94	12.6				
Nov. 5.8	29.33 ³⁰	66.6	11.69	60.9	57.21	27.9	61.26	10.6				
	30	11	35	2	58	24	32	20				
15.8	29.65 ³²	68.1	12.07	61.7	57.84	25.8	61.59	8.5				
	32	15	38	8	63	21	33	21				
25.7	29.98 ³³	69.9	12.47	63.0	58.50	24.2	61.94	6.5				
	33	18	40	13	66	16	35	18				
Dec. 5.7	30.31 ³³	72.0	12.87	64.9	59.17	23.1	62.30	4.7				
	33	23	39	19	67	5	36	17				
15.7	30.64	74.3	13.26	67.3	59.84	22.6	62.66	3.0				
	32	25	37	27	65	1	34	15				
25.7	30.96 ³²	76.8	13.63	70.0	60.49	22.5	63.00	1.5				
	29	25	34	31	59	5	33	12				
35.6	31.25	79.3	13.97	73.1	61.08	23.0	63.33	0.3				
	29	25	34	31	59	5	33	12				
Sec δ, Tan δ	1.022	— 0.211	1.339	— 0.891	2.414	+ 2.197	1.093	+ 0.442				
Mean Place	26°.654	60'' 44	9°.860	61'' 69	52°.653	58'' 59	57°.954	28'' 88				
D' δ a, D _a a	0.00	— 0.01	— 0.01	— 0.05	+ 0.03	+ 0.13	+ 0.01	+ 0.03				
D' δ, D _a δ	— 0.3	+ 0.5	— 0.4	+ 0.5	— 0.4	+ 0.5	— 0.4	+ 0.5				

FOR THE UPPER TRANSIT AT WASHINGTON

Mean Solar Date.	λ Ursæ Majoris. Mag. 3.5		γ Leonis <i>pr.</i> Mag. 2.6		μ Ursæ Majoris. Mag. 3.2		30 H. Ursæ Majoris. Mag. 4.9	
	Right Ascension.	Declination N.	Right Ascension.	Declination N.	Right Ascension.	Declination N.	Right Ascension.	Declination N.
	h m 10 11	° ' " +43 19	h m 10 15	° ' " +20 15	h m 10 17	° ' " +41 55	h m 10 18	° ' " +65 59
Jan. 0.7	60.81	69.5	18.91	71.9	18.36	26.5	5.12	32.4
10.6	61.17 ³⁶	69.4 ¹	19.21 ³⁰	70.7 ¹²	18.73 ³⁷	26.3 ²	5.70 ⁵⁸	33.2 ⁸
20.6	61.49 ³²	69.8 ⁴	19.48 ²⁷	69.8 ⁹	19.05 ³²	26.5 ²	6.21 ⁵¹	34.5 ¹³
30.6	61.75 ²⁶	70.5 ⁷	19.70 ²²	69.2 ⁶	19.31 ²⁶	27.1 ⁶	6.63 ⁴²	36.3 ¹⁸
Feb. 9.5	61.95 ²⁰	71.6 ¹¹	19.87 ¹⁷	69.0 ²	19.52 ²¹	28.1 ¹⁰	6.95 ³²	38.4 ²¹
	14	14	12	0	14	13	20	24
19.5	62.09	73.0	19.99	69.0	19.66	29.4	7.15	40.8
Mar. 1.5	62.16 ⁷	74.6 ¹⁶	20.06 ⁷	69.3 ³	19.73 ⁷	30.9 ¹⁵	7.24 ⁹	43.4 ²⁶
11.5	62.17 ¹	76.3 ¹⁷	20.08 ²	69.7 ⁴	19.75 ²	32.6 ¹⁷	7.22 ²	46.1 ²⁷
21.4	62.12 ⁵	78.0 ¹⁷	20.05 ³	70.3 ⁶	19.71 ⁴	34.3 ¹⁷	7.10 ¹²	48.6 ²⁵
31.4	62.02 ¹⁰	79.8 ¹⁸	19.99 ⁶	71.1 ⁸	19.62 ⁹	36.0 ¹⁷	6.89 ²¹	51.0 ²⁴
	13	16	9	8	13	16	23	22
Apr. 10.4	61.89	81.4	19.90	71.9	19.49	37.6	6.61	53.2
20.4	61.72 ¹⁷	82.8 ¹⁴	19.80 ¹⁰	72.7 ⁸	19.34 ¹⁵	39.0 ¹⁴	6.26 ³⁵	55.0 ¹⁸
30.3	61.54 ¹⁸	83.9 ¹¹	19.68 ¹²	73.5 ⁸	19.17 ¹⁷	40.2 ¹²	5.88 ³⁸	56.3 ¹³
May 10.3	61.35 ¹⁰	84.8 ⁹	19.55 ¹³	74.2 ⁷	18.98 ¹⁹	41.2 ¹⁰	5.48 ⁴⁰	57.2 ⁹
20.3	61.16 ¹⁸	85.4 ⁶	19.42 ¹³	74.8 ⁶	18.80 ¹⁸	41.8 ⁶	5.07 ⁴¹	57.7 ⁵
		2	11	4	17	3	40	1
30.2	60.98	85.6	19.31	75.2	18.63	42.1	4.67	57.6
June 9.2	60.82 ¹⁶	85.5 ¹	19.20 ¹¹	75.6 ⁴	18.47 ¹⁶	42.1 ⁰	4.30 ³⁷	57.0 ⁶
19.2	60.68 ¹⁴	85.1 ⁴	19.11 ⁹	75.8 ²	18.33 ¹⁴	41.7 ⁴	3.96 ³⁴	56.0 ¹⁰
29.2	60.57 ¹¹	84.3 ⁸	19.04 ⁷	75.8 ⁰	18.22 ¹¹	41.0 ⁷	3.66 ³⁰	54.5 ¹⁵
July 9.1	60.48 ⁹	83.3 ¹⁰	18.99 ⁵	75.7 ¹	18.13 ⁹	40.0 ¹⁰	3.42 ²⁴	52.6 ¹⁹
	5	14	3	2	5	12	18	22
19.1	60.43	81.9	18.96	75.5	18.08	38.8	3.24	50.4
29.1	60.41 ²	80.3 ¹⁶	18.96 ⁰	75.1 ⁴	18.05 ³	37.3 ¹⁵	3.13 ¹¹	47.8 ²⁶
Aug. 8.0	60.42 ¹	78.5 ¹⁸	18.98 ²	74.5 ⁶	18.06 ¹	35.5 ¹⁸	3.08 ⁵	45.0 ²⁸
18.0	60.47 ⁵	76.5 ²⁰	19.02 ⁴	73.7 ⁸	18.11 ⁵	33.6 ¹⁹	3.11 ³	41.9 ³¹
28.0	60.56 ⁹	74.3 ²²	19.10 ⁸	72.8 ⁹	18.19 ⁸	31.4 ²²	3.20 ⁹	38.7 ³²
	13	24	11	11	12	23	17	33
Sept. 7.0	60.69	71.9	19.21	71.7	18.31	29.1	3.37	35.4
16.9	60.87 ¹⁸	69.4 ²⁵	19.35 ¹⁴	70.4 ¹³	18.47 ¹⁶	26.7 ²⁴	3.62 ²⁵	32.1 ³³
26.9	61.08 ²¹	66.9 ²⁵	19.52 ¹⁷	68.9 ¹⁵	18.67 ²⁰	24.2 ²⁵	3.94 ³²	28.9 ³²
Oct. 6.9	61.33 ²⁵	64.3 ²⁶	19.73 ²¹	67.3 ¹⁶	18.91 ²⁴	21.7 ²⁵	4.33 ³⁹	25.7 ³²
16.9	61.62 ²⁹	61.8 ²⁵	19.97 ²⁴	65.5 ¹⁸	19.20 ²⁹	19.2 ²⁵	4.79 ⁴⁶	22.6 ³¹
	33	25	27	19	32	25	52	28
26.8	61.95	59.3	20.24	63.6	19.52	16.7	5.31	19.8
Nov. 5.8	62.32 ³⁷	57.0 ²³	20.54 ³⁰	61.6 ²⁰	19.87 ³⁵	14.3 ²⁴	5.89 ⁵⁸	17.4 ²⁴
15.8	62.72 ⁴⁰	54.9 ²¹	20.87 ³³	59.6 ²⁰	20.26 ³⁹	12.1 ²²	6.52 ⁶³	15.3 ²¹
25.7	63.14 ⁴²	53.0 ¹⁹	21.21 ³⁴	57.5 ²¹	20.67 ⁴¹	10.2 ¹⁹	7.18 ⁶⁶	13.6 ¹⁷
Dec. 5.7	63.56 ⁴²	51.4 ¹⁶	21.57 ³⁶	55.6 ¹⁹	21.09 ⁴²	8.6 ¹⁶	7.86 ⁶⁸	12.4 ¹²
	43	12	35	18	42	13	68	7
15.7	63.99	50.2	21.92	53.8	21.51	7.3	8.54	11.7
25.7	64.40 ⁴¹	49.4 ⁸	22.26 ³⁴	52.2 ¹⁶	21.91 ⁴⁰	6.4 ⁹	9.20 ⁶⁶	11.7 ⁰
35.6	64.79 ³⁹	49.1 ³	22.58 ³²	50.8 ¹⁴	22.30 ³⁹	5.9 ⁵	9.82 ⁶²	12.1 ⁴
Sec δ , Tan δ	1.375	+0.943	1.066	+0.369	1.344	+0.898	2.458	+2.245
Mean Place	58°.036	81°'.76	17°.315	78°'.09	16°.275	38°'.82	1°.440	48°'.46
$D'\psi\alpha$, $D\omega\alpha$	+0.01	+0.06	0.00	+0.02	+0.01	+0.05	+0.03	+0.14
$D'\psi\delta$, $D\omega\delta$	-0.4	+0.5	-0.4	+0.4	-0.4	+0.4	-0.4	+0.4

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	μ Hydre. Mag. 4.1		31 Leonis Minoris. Mag. 4.4		α Antilæ. Mag. 4.4		36 Ursæ Majoris. Mag. 4.8	
	Right Ascension.	Declination S.	Right Ascension.	Declination N.	Right Ascension.	Declination S.	Right Ascension.	Declination N.
	h m 10 21	° ' -16 24	h m 10 22	° ' +37 8	h m 10 23	° ' -30 37	h m 10 25	° ' +56 24
	s "	"	s "	"	s "	"	s "	"
an. 0.7	59.92 ²⁸	3.8 ²⁶	60.33 ³⁵	23.5 ⁵	16.73 ³⁰	58.7 ³⁰	14.56 ⁴⁶	45.1 ⁴
10.6	60.20 ²⁵	6.4 ²⁷	60.68 ³⁰	23.0 ¹	17.03 ²⁶	61.7 ³¹	15.02 ⁴¹	45.5 ⁸
20.6	60.45 ²¹	9.1 ²⁵	60.98 ²⁶	22.9 ³	17.29 ²¹	64.8 ³¹	15.43 ³⁴	46.3 ¹³
30.6	60.66 ¹⁶	11.6 ²⁴	61.24 ¹⁴	23.2 ⁷	17.50 ¹¹	67.9 ²⁹	15.77 ¹⁸	47.6 ²⁰
eb. 9.5	60.82 ¹¹	14.0 ²²	61.44 ¹¹	23.9 ¹⁵	17.66 ¹⁰	71.0 ¹⁵	16.03 ¹³	49.3 ²²
19.5	60.93 ⁶	16.2 ²⁰	61.58 ⁸	25.0 ¹²	17.77 ⁶	73.9 ²⁷	16.21 ¹⁰	51.3 ²²
ar. 1.5	60.99 ¹	18.2 ¹⁷	61.66 ³	26.2 ¹⁴	17.83 ¹	76.6 ²⁴	16.31 ⁶	53.5 ²³
11.5	61.00 ²	19.9 ¹⁴	61.69 ⁷	27.6 ¹⁵	17.84 ⁷	79.0 ¹⁹	16.32 ¹³	55.8 ²⁰
21.4	60.98 ⁸	21.3 ⁹	61.66 ¹¹	29.2 ¹⁵	17.80 ¹⁰	81.2 ¹⁵	16.26 ¹⁸	58.1 ²²
31.4	60.92 ¹⁰	22.5 ⁶	61.59 ¹⁴	30.7 ¹³	17.73 ¹²	83.1 ¹²	16.13 ²³	60.3 ¹⁸
pr. 10.4	60.84 ¹⁰	23.4 ⁶	61.48 ¹⁴	32.2 ¹³	17.63 ¹²	84.6 ¹²	15.95 ²³	62.3 ¹⁸
20.4	60.74 ¹²	24.0 ³	61.34 ¹⁵	33.5 ¹²	17.51 ¹⁴	85.8 ⁹	15.72 ²⁶	64.1 ¹⁴
30.3	60.62 ¹²	24.3 ¹	61.19 ¹⁶	34.7 ⁹	17.37 ¹⁴	86.7 ⁵	15.46 ²⁷	65.5 ¹¹
ay 10.3	60.50 ¹²	24.4 ²	61.03 ¹⁷	35.6 ⁷	17.23 ¹⁵	87.2 ¹	15.19 ²⁷	66.6 ⁶
20.3	60.38 ¹²	24.2 ⁴	60.86 ¹⁵	36.3 ⁴	17.08 ¹⁵	87.3 ²	14.92 ²⁷	67.2 ¹
30.2	60.26 ¹¹	23.8 ⁶	60.71 ¹⁴	36.7 ¹	16.93 ¹⁴	87.1 ⁶	14.65 ²⁵	67.3 ²
ine 9.2	60.15 ¹⁰	23.2 ⁸	60.57 ¹³	36.8 ²	16.79 ¹²	86.5 ⁸	14.40 ²³	67.1 ⁷
19.2	60.10 ⁸	22.4 ¹⁰	60.44 ¹⁰	36.6 ⁵	16.67 ¹¹	85.7 ¹²	14.17 ¹⁹	66.4 ¹¹
29.2	59.97 ⁷	21.4 ¹¹	60.34 ⁹	36.1 ⁷	16.56 ¹⁰	84.5 ¹⁵	13.98 ¹⁶	65.3 ¹⁵
ily 9.1	59.90 ⁵	20.3 ¹³	60.25 ⁵	35.4 ¹⁰	16.46 ⁷	83.0 ¹⁶	13.82 ¹²	63.8 ¹⁸
19.1	59.85 ²	19.0 ¹³	60.20 ²	34.4 ¹³	16.39 ⁵	81.4 ¹⁸	13.70 ⁷	62.0 ²²
29.1	59.83 ⁰	17.7 ¹³	60.18 ¹	33.1 ¹⁵	16.34 ²	79.6 ¹⁹	13.63 ³	59.8 ²⁴
ug. 8.1	59.83 ²	16.4 ¹³	60.19 ³	31.6 ¹⁷	16.32 ²	77.7 ¹⁹	13.60 ³	57.4 ²⁷
18.0	59.85 ⁶	15.1 ¹²	60.22 ⁷	29.9 ¹⁹	16.34 ⁴	75.8 ¹⁹	13.63 ⁷	54.7 ²⁸
28.0	59.91 ⁹	13.9 ¹⁰	60.29 ¹¹	28.0 ²¹	16.38 ⁹	73.9 ¹⁸	13.70 ¹³	51.9 ³⁰
pt. 7.0	60.00 ¹²	12.9 ⁸	60.40 ¹⁵	25.9 ²²	16.47 ¹²	72.1 ¹⁵	13.83 ¹⁸	48.9 ³⁰
16.9	60.12 ¹⁶	12.1 ⁵	60.55 ¹⁸	23.7 ²³	16.59 ¹⁷	70.6 ¹³	14.01 ²³	45.9 ³¹
26.9	60.28 ¹⁹	11.6 ²	60.73 ²³	21.4 ²⁴	16.76 ²⁰	69.3 ⁹	14.24 ²⁹	42.8 ³⁰
ct. 6.9	60.47 ²³	11.4 ¹	60.96 ²⁶	19.0 ²⁴	16.96 ²⁵	68.4 ⁵	14.53 ³⁵	39.8 ²⁹
16.9	60.70 ²⁶	11.5 ⁶	61.22 ³⁰	16.6 ²⁴	17.21 ²⁸	67.9 ⁰	14.88 ³⁹	36.9 ²⁸
26.8	60.96 ²⁹	12.1 ⁹	61.52 ³⁴	14.2 ²⁴	17.49 ³¹	67.9 ⁵	15.27 ⁴⁴	34.1 ²⁶
ov. 5.8	61.25 ³²	13.0 ¹⁴	61.86 ³⁶	11.8 ²²	17.80 ³⁴	68.4 ¹⁰	15.71 ⁴⁸	31.5 ²²
15.8	61.57 ³³	14.4 ¹⁷	62.22 ³⁹	9.6 ²⁰	18.14 ³⁶	69.4 ¹⁴	16.19 ⁵¹	29.3 ¹⁹
25.8	61.90 ³⁵	16.1 ²¹	62.61 ⁴⁰	7.6 ¹⁵	18.50 ³⁷	70.8 ²³	16.70 ⁵³	27.4 ¹⁰
æc. 5.7	62.25 ³⁴	18.2 ²³	63.00 ⁴⁰	5.8 ¹¹	18.87 ³⁶	72.7 ²³	17.23 ⁵³	25.9 ⁵
15.7	62.59 ³²	20.5 ²⁴	63.40 ³⁹	4.3 ¹¹	19.23 ³⁵	75.0 ²⁷	17.76 ⁵¹	24.9 ⁵
25.7	62.91 ³¹	22.9 ²⁶	63.79 ³⁶	3.2 ⁷	19.58 ³²	77.7 ²⁸	18.27 ⁴⁸	24.4 ⁰
35.6	63.22 ³¹	25.5 ²⁶	64.15 ³⁶	2.5 ⁷	19.90 ³²	80.5 ²⁸	18.75 ⁴⁸	24.4 ⁰
δ , Tan δ	1.042	-0.294	1.254	+0.757	1.162	-0.592	1.808	+1.506
n Place	58°.735	7''.03	58°.420	35''.19	15°.630	65''.93	15°.852	60''.55
α , D_{α} α	0.00	-0.02	+0.01	+0.05	-0.01	-0.04	+0.02	+0.09
δ , D_{δ} δ	-0.4	+0.4	-0.4	+0.4	-0.4	+0.4	-0.4	+0.4

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	9 H. Draconis. Mag. 5.0		ρ Leonis. Mag. 3.8		33 Sextantis. Mag. 6.4		41 Leonis Minoris. Mag. 5.0	
	Right Ascension.	Declination N.	Right Ascension.	Declination N.	Right Ascension.	Declination S.	Right Ascension.	Declination N.
	h m 10 27	° ' +76 8	h m 10 28	° ' + 9 44	h m 10 37	° ' - 1 17	h m 10 38	° ' +23 37
Jan. 0.7	60.17	47.4	21.62	35.1	5.96	40.9	49.37	52.2
10.6	61.10	48.4	21.92	33.4	6.25	43.0	49.69	51.1
20.6	61.92	50.0	22.18	31.9	6.51	45.0	49.98	50.2
30.6	62.60	52.1	22.40	30.7	6.73	46.8	50.22	49.7
Feb. 9.6	63.11	54.5	22.57	29.7	6.91	48.4	50.42	49.6
19.5	63.44	57.2	22.69	29.1	7.04	49.8	50.56	49.8
Mar. 1.5	63.58	60.1	22.77	28.7	7.12	50.9	50.66	50.2
11.5	63.54	63.0	22.81	28.5	7.16	51.7	50.70	50.9
21.4	63.33	65.8	22.80	28.6	7.16	52.3	50.69	51.7
31.4	62.96	68.4	22.75	28.8	7.12	52.7	50.65	52.7
Apr. 10.4	62.46	70.7	22.68	29.2	7.06	52.8	50.58	53.7
20.4	61.85	72.7	22.59	29.7	6.97	52.8	50.48	54.7
30.3	61.16	74.1	22.48	30.2	6.87	52.7	50.37	55.7
May 10.3	60.42	75.1	22.37	30.7	6.77	52.4	50.24	56.5
20.3	59.66	75.5	22.26	31.3	6.66	52.0	50.12	57.3
30.3	58.90	75.4	22.15	31.8	6.56	51.5	50.00	57.9
June 9.2	58.18	74.7	22.05	32.3	6.46	50.9	49.88	58.3
19.2	57.51	73.5	21.96	32.8	6.37	50.3	49.78	58.5
29.2	56.91	71.8	21.89	33.2	6.29	49.7	49.69	58.6
July 9.1	56.40	69.7	21.83	33.5	6.23	49.0	49.62	58.4
19.1	55.99	67.2	21.80	33.7	6.18	48.3	49.57	58.0
29.1	55.69	64.3	21.78	33.9	6.16	47.7	49.54	57.5
Aug. 8.1	55.51	61.2	21.79	33.9	6.15	47.1	49.54	56.8
18.0	55.45	57.8	21.82	33.7	6.17	46.6	49.56	55.8
28.0	55.52	54.3	21.88	33.4	6.22	46.3	49.61	54.7
Sept. 7.0	55.72	50.7	21.97	32.9	6.30	46.2	49.69	53.3
17.0	56.04	47.1	22.09	32.2	6.41	46.2	49.81	51.8
26.9	56.50	43.5	22.24	31.3	6.55	46.5	49.96	50.1
Oct. 6.9	57.08	40.1	22.43	30.1	6.72	47.1	50.14	48.2
16.9	57.77	36.9	22.65	28.7	6.93	48.0	50.37	46.2
26.8	58.58	34.0	22.90	27.2	7.18	49.1	50.63	44.1
Nov. 5.8	59.48	31.5	23.19	25.4	7.46	50.6	50.92	42.0
15.8	60.46	29.3	23.50	23.5	7.76	52.3	51.24	39.8
25.8	61.50	27.7	23.82	21.4	8.08	54.2	51.58	37.6
Dec. 5.7	62.57	26.6	24.16	19.4	8.42	56.3	51.94	35.5
15.7	63.65	26.1	24.50	17.4	8.75	58.5	52.30	33.7
25.7	64.69	26.2	24.83	15.4	9.08	60.7	52.65	32.0
35.7	65.68	26.9	25.15	13.6	9.39	62.9	52.99	30.6
Sec δ , Tan δ	4.177	+4.055	1.015	+0.172	1.000	-0.023	1.092	+0.438
Mean Place	54°.385	64°.96	20°.236	39°.87	4°.733	39°.07	47°.842	61°.50
$D'_{\psi} \alpha$, $D_{\mu} \alpha$	+0.04	+0.25	0.00	+0.01	0.00	0.00	0.00	+0.03
$D'_{\psi} \delta$, $D_{\mu} \delta$	-0.4	+0.4	-0.4	+0.4	-0.4	+0.4	-0.4	+0.3

FOR THE UPPER TRANSIT, AT WASHINGTON.

Mean Solar Date.	θ Argus. Mag. 3.0		42 Leonis Minoris. Mag. 5.4		η Argus. Var. 1.6-6.6		μ Argus. Mag. 2.8	
	Right Ascension.	Declination S.	Right Ascension.	Declination N.	Right Ascension.	Declination S.	Right Ascension.	Declination S.
	h m 10 39	° ' " -63 56	h m 10 41	° ' " +31 7	h m 10 41	° ' " -59 14	h m 10 43	° ' " -48 58
	s 10 39	" -63 56	s 10 41	" +31 7	s 10 41	" -59 14	s 10 43	" -48 58
Jan. 0.7	56.18	43.5	10.18	37.8	46.52	1.1	7.53	4.3
10.6	56.66 ⁴⁸	46.6 ³¹	10.52 ³⁴	36.9 ⁹	46.95 ⁴³	4.2 ³¹	7.90 ³⁷	7.4 ³¹
20.6	57.08 ⁴²	50.0 ³⁴	10.83 ³¹	36.4 ⁵	47.33 ³⁸	7.6 ³⁴	8.23 ³³	10.7 ³³
30.6	57.41 ³³	53.7 ³⁷	11.09 ²⁶	36.3 ¹	47.63 ³⁰	11.3 ³⁷	8.49 ²⁶	14.2 ³⁵
Feb. 9.6	57.65 ²⁴	57.5 ³⁸	11.30 ²¹	36.6 ³	47.86 ²³	15.0 ³⁷	8.69 ²⁰	17.8 ³⁶
19.5	57.80 ¹⁵	61.4 ³⁹	11.45 ¹⁵	37.2 ⁶	48.01 ¹⁵	18.8 ³⁸	8.83 ¹⁴	21.4 ³⁶
Mar. 1.5	57.86 ⁶	65.3 ³⁹	11.55 ¹⁰	38.1 ⁹	48.08 ⁷	22.6 ³⁸	8.91 ⁸	24.9 ³⁵
11.5	57.84 ²	69.0 ³⁷	11.59 ⁴	39.2 ¹¹	48.08 ⁸	26.2 ³⁶	8.93 ²	28.2 ³³
21.4	57.74 ¹⁰	72.5 ³⁵	11.59 ⁰	40.5 ¹³	48.00 ⁸	29.6 ³⁴	8.89 ⁴	31.3 ³¹
31.4	57.58 ¹⁶	75.8 ³³	11.54 ⁵	41.8 ¹³	47.87 ¹³	32.7 ³¹	8.81 ⁸	34.0 ²⁷
Apr. 10.4	57.35 ²³	78.7 ²⁹	11.46 ⁸	43.1 ¹³	47.69 ¹⁸	35.5 ²⁸	8.68 ¹³	36.5 ²⁵
20.4	57.07 ²⁸	81.2 ²⁵	11.36 ¹⁰	44.4 ¹³	47.46 ²³	37.9 ²⁴	8.52 ¹⁶	38.5 ²⁰
30.3	56.75 ³²	83.3 ²¹	11.23 ¹³	45.6 ¹²	47.20 ²⁶	39.9 ²⁰	8.34 ¹⁸	40.1 ¹⁶
May 10.3	56.40 ³⁵	84.9 ¹⁶	11.09 ¹⁴	46.6 ¹⁰	46.91 ²⁹	41.4 ¹⁵	8.13 ²¹	41.4 ¹³
20.3	56.03 ³⁷	86.0 ¹¹	10.95 ¹⁴	47.4 ⁸	46.61 ³⁰	42.4 ¹⁰	7.92 ²¹	42.1 ⁷
30.3	55.64 ³⁹	86.6 ⁶	10.81 ¹⁴	47.9 ⁵	46.30 ³¹	42.9 ⁵	7.70 ²²	42.4 ³
June 9.2	55.26 ³⁸	86.6 ⁰	10.68 ¹³	48.3 ⁴	45.99 ³¹	42.9 ⁰	7.49 ²¹	42.2 ²
19.2	54.89 ³⁷	86.2 ⁴	10.57 ¹¹	48.4 ¹	45.69 ³⁰	42.4 ⁵	7.28 ²¹	41.6 ⁶
29.2	54.54 ³⁵	85.3 ⁹	10.47 ¹⁰	48.2 ²	45.40 ²⁹	41.4 ¹⁰	7.09 ¹⁹	40.6 ¹⁰
July 9.1	54.22 ³²	83.8 ¹⁵	10.39 ⁸	47.8 ⁴	45.14 ²⁶	40.0 ¹⁴	6.91 ¹⁸	39.2 ¹⁴
19.1	53.93 ²⁹	82.0 ¹⁸	10.33 ⁶	47.1 ⁷	44.91 ²³	38.2 ¹⁸	6.76 ¹⁵	37.4 ¹⁸
29.1	53.70 ²³	79.8 ²²	10.29 ⁴	46.2 ⁹	44.73 ¹⁸	36.0 ²²	6.64 ¹²	35.3 ²¹
Aug. 8.1	53.53 ¹⁷	77.3 ²⁵	10.28 ¹	45.0 ¹²	44.59 ¹⁴	33.5 ²⁵	6.55 ⁹	33.0 ²³
18.0	53.42 ¹¹	74.6 ²⁷	10.30 ²	43.6 ¹⁴	44.51 ⁸	30.8 ²⁷	6.51 ⁴	30.6 ²⁴
28.0	53.38 ⁴	71.7 ²⁹	10.35 ⁵	42.1 ¹⁵	44.49 ²	28.1 ²⁷	6.51 ⁰	28.1 ²⁵
Sept. 7.0	53.43 ⁵	68.8 ²⁹	10.43 ⁸	40.3 ¹⁸	44.54 ⁵	25.3 ²⁸	6.57 ⁶	25.6 ²⁵
17.0	53.56 ¹³	66.1 ²⁷	10.54 ¹¹	38.4 ¹⁹	44.66 ¹²	22.6 ²⁷	6.68 ¹¹	23.2 ²⁴
26.9	53.78 ²²	63.5 ²⁶	10.70 ¹⁶	36.3 ²¹	44.85 ¹⁹	20.2 ²⁴	6.84 ¹⁶	21.1 ²¹
Oct. 6.9	54.09 ³¹	61.2 ²³	10.89 ¹⁹	34.1 ²²	45.12 ²⁷	18.1 ²¹	7.07 ²³	19.4 ¹⁷
16.9	54.48 ³⁹	59.4 ¹⁸	11.12 ²³	31.8 ²³	45.47 ³⁵	16.4 ¹⁷	7.35 ²⁸	18.0 ¹⁴
26.8	54.94 ⁴⁶	58.1 ¹³	11.27 ²⁷	29.4 ²⁴	45.87 ⁴⁰	15.2 ¹²	7.68 ³³	17.2 ⁸
Nov. 5.8	55.46 ⁵²	57.3 ⁸	11.39 ³⁰	27.0 ²⁴	46.33 ⁴⁶	14.5 ⁷	7.68 ³⁷	16.8 ⁴
15.8	56.03 ⁵⁷	57.2 ¹	12.03 ³⁴	24.7 ²³	46.83 ⁵⁰	14.5 ⁰	8.05 ⁴¹	17.1 ³
25.8	56.63 ⁶⁰	57.7 ⁵	12.39 ³⁶	22.5 ²²	47.36 ⁵³	15.1 ⁶	8.46 ⁴¹	17.9 ⁸
Dec. 5.7	57.24 ⁶¹	58.8 ¹¹	12.76 ³⁷	20.5 ²⁰	47.90 ⁵⁴	16.3 ¹²	8.90 ⁴⁴	19.4 ¹⁵
15.7	57.84 ⁶⁰	60.6 ¹⁸	13.14 ³⁸	18.8 ¹⁷	48.44 ⁵⁴	18.1 ¹⁸	9.35 ⁴⁴	21.4 ²⁰
25.7	58.42 ⁵⁸	62.9 ²³	13.51 ³⁷	17.3 ¹⁵	48.95 ⁵¹	20.5 ²⁴	10.22 ⁴³	23.8 ²⁴
35.7	58.94 ⁵²	65.8 ²⁹	13.87 ³⁶	16.2 ¹¹	49.42 ⁴⁷	23.4 ²⁹	10.62 ⁴⁰	26.7 ²⁹
Sec δ , Tan δ	2.277	-2.046	1.168	+0.604	1.955	-1.680	1.524	-1.149
Mean Place	55°.223	57'°.98	8°.529	49'°.16	45°.592	14'°.78	6°.611	15'°.91
$D\phi a$, $D_\alpha a$	-0.02	-0.13	+0.01	+0.04	-0.01	-0.11	-0.01	-0.07
$D\phi \delta$, $D_\alpha \delta$	-0.4	+0.3	-0.4	+0.3	-0.4	+0.3	-0.4	+0.3

[Bph 13]

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	♌ Leonis. Mag. 5.3		♐ Chamæleon. Mag. 4.6		♑ Hydræ. Mag. 3.3		♋ Leonis Minoris. Mag. 3.9	
	Right Ascension.	Declination N.	Right Ascension.	Declination S.	Right Ascension.	Declination S.	Right Ascension.	Declination N.
	h m 10 44	° ' +10 59	h m 10 44	° ' -80 5	h m 10 45	° ' -15 44	h m 10 48	° ' +34 39
	s 10 44	" "	s 10 44	" "	s 10 45	" "	s 10 48	" "
Jan. 0.7	48.78	36.8	60.99	14.2	26.84	51.6	35.43	71.7
10.6	49.09 ³¹	35.1 ¹⁷	62.06 ¹⁰⁷	17.0 ²⁸	27.14 ³⁰	54.2 ²⁶	35.78 ³⁵	70.9 ⁸
20.6	49.37 ²⁸	33.6 ¹⁵	62.95 ⁸⁹	20.3 ³³	27.41 ²⁷	56.8 ²⁶	36.10 ³²	70.6 ³
30.6	49.60 ²³	32.4 ¹²	63.65 ⁷⁰	23.9 ³⁶	27.64 ²³	59.3 ²⁵	36.38 ²⁸	70.6 ⁰
Feb. 9.6	49.79 ¹⁹	31.5 ⁹	64.15 ⁵⁰	27.7 ³⁸	27.82 ¹⁸	61.6 ²³	36.60 ²²	71.0 ⁴
	49.79 ¹⁴	31.5 ⁶	64.15 ²⁸	27.7 ⁴⁰	27.82 ¹³	61.6 ²²	36.60 ¹⁷	71.0 ⁸
Mar. 19.5	49.93	30.9	64.43	31.7	27.95	63.8	36.77	71.8
1.5	50.03 ¹⁰	30.6 ³	64.51 ⁸	35.7 ⁴⁰	28.04 ⁹	65.7 ¹⁹	36.88 ¹¹	72.9 ¹¹
11.5	50.08 ⁵	30.5 ¹	64.37 ¹⁴	39.6 ³⁹	28.08 ⁴	67.4 ¹⁷	36.93 ⁵	74.2 ¹³
21.5	50.08 ⁰	30.6 ¹	64.04 ³³	43.4 ³⁸	28.08 ⁰	68.9 ¹⁵	36.94 ¹	75.6 ¹⁴
31.4	50.05 ³	30.9 ³	63.54 ⁵⁰	47.0 ³⁶	28.05 ³	70.0 ¹¹	36.90 ⁴	77.1 ¹⁵
	50.05 ⁶	30.9 ⁵	63.54 ⁶⁷	47.0 ³³	28.05 ⁶	70.0 ⁹	36.90 ⁸	77.1 ¹⁵
Apr. 10.4	49.99	31.4	62.87	50.3	27.99	70.9	36.82	78.6
20.4	49.91 ⁸	31.9 ⁵	62.07 ⁸⁰	53.3 ³⁰	27.91 ⁸	71.6 ⁷	36.71 ¹¹	80.0 ¹⁴
30.3	49.82 ⁹	32.5 ⁶	61.15 ⁹²	55.8 ²⁵	27.81 ¹⁰	72.0 ⁴	36.57 ¹⁴	81.3 ¹³
May 10.3	49.71 ¹¹	33.1 ⁶	60.13 ¹⁰²	57.9 ²¹	27.70 ¹¹	72.1 ¹	36.43 ¹⁴	82.4 ¹¹
20.3	49.60 ¹¹	33.7 ⁶	59.04 ¹⁰⁹	59.4 ¹⁵	27.59 ¹¹	72.0 ¹	36.28 ¹⁵	83.3 ⁹
	49.60 ¹¹	33.7 ⁶	59.04 ¹¹³	59.4 ¹⁰	27.59 ¹²	72.0 ³	36.28 ¹⁴	83.3 ⁶
June 30.3	49.49	34.3	57.91	60.4	27.47	71.7	36.14	83.9
9.2	49.39 ¹⁰	34.8 ⁵	56.77 ¹¹⁴	60.9 ⁵	27.37 ¹⁰	71.2 ⁵	36.00 ¹⁴	84.2 ³
19.2	49.30 ⁰	35.3 ⁵	55.64 ¹¹³	60.8 ¹	27.27 ¹⁰	70.5 ⁷	35.87 ¹³	84.3 ¹
29.2	49.22 ⁸	35.7 ⁴	54.55 ¹⁰⁹	60.2 ⁶	27.18 ⁹	69.6 ⁹	35.75 ¹²	84.0 ³
July 9.2	49.15 ⁷	36.0 ³	53.53 ¹⁰²	59.1 ¹¹	27.10 ⁸	68.6 ¹⁰	35.66 ⁹	83.5 ⁵
	49.15 ⁴	36.0 ²	53.53 ⁹²	59.1 ¹⁷	27.10 ⁶	68.6 ¹²	35.66 ⁷	83.5 ⁸
19.1	49.11	36.2	52.61	57.4	27.04	67.4	35.59	82.7
29.1	49.08 ³	36.2 ⁰	51.83 ⁷⁸	55.4 ²⁰	27.00 ⁴	66.2 ¹²	35.54 ⁵	81.7 ¹⁰
Aug. 8.1	49.07 ¹	36.1 ¹	51.21 ⁶²	52.9 ²⁵	26.98 ²	65.0 ¹²	35.52 ²	80.4 ¹³
18.0	49.09 ²	35.9 ²	50.77 ⁴⁴	50.2 ²⁷	26.98 ⁰	63.8 ¹²	35.53 ¹	78.8 ¹⁶
28.0	49.13 ⁴	35.5 ⁴	50.53 ²⁴	47.2 ³⁰	27.02 ⁴	62.7 ¹¹	35.57 ⁴	77.0 ¹⁸
	49.13 ⁷	35.5 ⁶	50.53 ²	47.2 ³⁰	27.02 ⁶	62.7 ¹⁰	35.57 ⁷	77.0 ¹⁹
Sept. 7.0	49.20	34.9	50.51	44.2	27.08	61.7	35.64	75.1
17.0	49.31 ¹¹	34.1 ⁸	50.71 ²⁰	41.2 ³⁰	27.18 ¹⁰	60.9 ⁸	35.75 ¹¹	72.9 ²²
26.9	49.44 ¹³	33.1 ¹⁰	51.15 ⁴⁴	38.3 ²⁹	27.32 ¹⁴	60.4 ⁵	35.90 ¹⁵	70.6 ²³
Oct. 6.9	49.62 ¹⁸	31.9 ¹²	51.81 ⁶⁶	35.7 ²⁶	27.49 ¹⁷	60.1 ³	36.09 ¹⁹	68.2 ²⁴
16.9	49.82 ²⁰	30.4 ¹⁵	52.67 ⁸⁶	33.5 ²²	27.70 ²¹	60.3 ²	36.32 ²³	65.7 ²⁵
	49.82 ²⁵	30.4 ¹⁶	52.67 ¹⁰⁴	33.5 ¹⁸	27.70 ²⁴	60.3 ⁵	36.32 ²⁷	65.7 ²⁵
Nov. 26.9	50.07	28.8	53.71	31.7	27.94	60.8	36.59	63.2
5.8	50.34 ²⁷	26.9 ¹⁹	54.90 ¹¹⁰	30.5 ¹²	28.22 ²⁸	61.7 ⁹	36.90 ³¹	60.7 ²⁵
15.8	50.64 ³⁰	24.9 ²⁰	56.21 ¹³¹	29.9 ⁶	28.53 ³¹	62.9 ¹²	37.24 ³⁴	58.3 ²⁴
25.8	50.97 ³³	22.9 ²⁰	57.58 ¹³⁷	29.9 ⁰	28.86 ³³	64.6 ¹⁷	37.60 ³⁶	56.0 ²³
Dec. 5.7	51.31 ³⁴	20.8 ²¹	58.97 ¹³⁹	30.6 ⁷	29.20 ³⁴	66.5 ¹⁹	37.99 ³⁹	54.0 ²⁰
	51.31 ³⁴	20.8 ²¹	58.97 ¹³⁵	30.6 ¹⁴	29.20 ³⁵	66.5 ²²	37.99 ³⁹	54.0 ¹⁸
15.7	51.65	18.7	60.32	32.0	29.55	68.7	38.38	52.2
25.7	51.99 ³⁴	16.7 ²⁰	61.60 ¹²⁸	33.9 ¹⁹	29.89 ³⁴	71.1 ²⁴	38.76 ³⁸	50.8 ¹⁴
35.7	52.31 ³²	14.8 ¹⁹	62.77 ¹¹⁷	36.5 ²⁶	30.20 ³¹	73.7 ²⁶	39.13 ³⁷	49.8 ¹⁰
Sec δ. Tan δ	1.019	+0.194	5.813	-5.726	1.039	-0.282	1.216	+0.692
Mean Place	47° 47.3	42° 68	59° 8.30	30° 67	25° 77.4	54° 10	33° 747	84° 43
D'ψ α, D _α α	0.00	+0.01	-0.05	-0.36	0.00	-0.02	+0.01	+0.04
D'ψ δ, D _δ δ	-0.4	+0.3	-0.4	+0.3	-0.4	+0.3	-0.4	+0.3

FOR THE UPPER TRANSIT AT WASHINGTON

Mean Solar Date.	54 Leonis. Mag. 4.5		Antliae. Mag. 4.7		Groombridge 1706. Mag. 6.3		α Crateris. Mag. 4.2	
	Right Ascension.	Declination N.	Right Ascension.	Declination S.	Right Ascension.	Declination N.	Right Ascension.	Declination S.
	h m 10 51	° ' " +25 11	h m 10 52	° ' " -36 40	h m 10 53	° ' " +78 12	h m 10 55	° ' " -17 50
Jan. 0.7	2.29	61.9	46.41	41.7	17.51	73.4	38.89	43.1
10.6	2.62 33	60.7 12	46.75 34	44.7 30	18.63 112	74.2 8	39.20 31	45.7 26
20.6	2.92 30	59.9 8	47.05 30	47.8 31	19.64 101	75.5 13	39.47 27	48.3 26
30.6	3.18 26	59.4 5	47.30 25	51.0 32	20.50 86	77.4 19	39.71 24	50.8 25
Feb. 9.6	3.39 21	59.3 1	47.50 20	54.2 32	21.18 68	79.7 23	39.90 19	53.3 25
	16	2	15	32	48	27	14	23
19.5	3.55	59.5	47.65	57.4	21.66	82.4	40.04	55.6
Mar. 1.5	3.65 10	60.0 5	47.74 9	60.4 30	21.93 27	85.3 29	40.14 10	57.6 20
11.5	3.71 6	60.8 8	47.78 4	63.2 28	21.99 6	88.2 29	40.20 6	59.5 19
21.5	3.72 1	61.8 10	47.78 0	65.8 26	21.84 15	91.2 30	40.21 1	61.1 16
31.4	3.69 3	62.8 10	47.74 4	68.0 22	21.49 35	94.0 28	40.18 3	62.4 13
	7	12	8	20	52	25	5	10
Apr. 10.4	3.62	64.0	47.66	70.0	20.97	96.5	40.13	63.4 8
20.4	3.53 9	65.1 11	47.55 11	71.6 16	20.32 65	98.7 22	40.05 8	64.2 5
30.3	3.42 11	66.2 11	47.42 13	72.9 13	19.55 77	100.4 17	39.95 10	64.7 2
May 10.3	3.30 12	67.1 9	47.28 14	73.8 9	18.69 86	101.7 13	39.85 10	64.9 0
20.3	3.18 12	67.9 8	47.13 15	74.3 5	17.79 90	102.4 7	39.74 11	64.9 2
	12	7	15	1	91	1	12	
30.3	3.06 12	68.6	46.98	74.4	16.88	102.5	39.62	64.7 4
June 9.2	2.94 11	69.0 4	46.82 16	74.1 3	15.99 89	102.1 4	39.51 11	64.3 7
19.2	2.83 11	69.3 3	46.67 15	73.5 6	15.13 86	101.2 9	39.41 10	63.6 9
29.2	2.73 10	69.3 0	46.54 13	72.6 9	14.34 79	99.8 14	39.31 10	62.7 10
July 9.2	2.65 8	69.2 4	46.41 13	71.3 13	13.64 60	97.8 23	39.23 8	61.7 12
	6	1	10	16			7	
19.1	2.59 4	68.8 6	46.31 8	69.7 18	13.04 48	95.5 28	39.16 5	60.5 12
29.1	2.55 1	68.2 8	46.23 6	67.9 19	12.56 36	92.7 31	39.11 3	59.3 13
Aug. 8.1	2.54 1	67.4 10	46.17 3	66.0 20	12.20 31	89.6 33	39.08 1	58.0 12
18.0	2.55 3	66.4 13	46.14 1	64.0 21	11.99 7	86.3 36	39.07 2	56.8 12
28.0	2.58 7	65.1 14	46.15 5	61.9 20	11.92 9	82.7 37	39.09 5	55.6 11
Sept. 7.0	2.65 10	63.7 17	46.20 9	59.9 18	12.01 24	79.0 37	39.14 9	54.5 9
17.0	2.75 14	62.0 18	46.29 14	58.1 16	12.25 39	75.3 37	39.23 12	53.6 7
26.9	2.89 17	60.2 19	46.43 19	56.5 13	12.64 54	71.6 37	39.35 17	52.9 3
Oct. 6.9	3.06 22	58.3 21	46.62 23	55.2 9	13.18 68	68.0 36	39.52 20	52.6 1
16.9	3.28 25	56.2 23	46.85 27	54.3 5	13.86 83	64.6 34	39.72 24	52.5 4
26.9	3.53 28	53.9 22	47.12 32	53.8 1	14.69 95	61.4 28	39.96 28	52.9 8
Nov. 5.8	3.81 32	51.7 23	47.44 35	53.9 5	15.64 105	58.6 25	40.24 30	53.7 12
15.8	4.13 34	49.4 21	47.79 37	54.4 11	16.69 115	56.1 19	40.54 33	54.9 15
25.8	4.47 37	47.1 19	48.16 39	55.5 16	17.84 121	54.2 14	40.87 34	56.4 19
Dec. 5.7	4.82 37	45.0 19	48.55 39	57.1 21	19.05 123	52.8 8	41.21 35	58.3 22
15.7	5.19 36	43.1 17	48.94 38	59.2 24	20.28 121	52.0 3	41.56 34	60.5 24
25.7	5.55 34	41.4 14	49.32 36	61.6 28	21.49 116	51.7 5	41.90 33	62.9 25
35.7	5.89 34	40.0 14	49.68 36	64.4	22.65	52.2	42.23 33	65.4
Sec δ, Tan δ	1.105	+0.471	1.247	-0.745	4.899	+4.796	1.051	-0.322
Mean Place	0°.813	72''.25	45°.515	50''.23	11°.477	93''.02	37°.895	45''.95
D _φ α, D _ω α	0.00	+0.03	-0.01	-0.05	+0.04	+0.31	0.00	-0.02
D _φ δ, D _ω δ	-0.4	+0.3	-0.4	+0.3	-0.4	+0.3	-0.4	+0.3

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	<i>d</i> Leonis. Mag. 5.0		<i>β</i> Ursæ Majoris. Mag. 2.4		<i>α</i> Ursæ Majoris. Mag. 2.0		<i>χ</i> Leonis. Mag. 4.7	
	Right Ascension.	Declination N.	Right Ascension.	Declination N.	Right Ascension.	Declination N.	Right Ascension.	Declination N.
	h m 10 56	° ' " + 4 4	h m 10 56	° ' " + 56 49	h m 10 58	° ' " + 62 11	h m 11 0	° ' " + 7 47
Jan. 0.7	11.45 ^s	22.5 ["]	45.74 ^s	60.1 ["]	32.46 ^s	77.9 ["]	39.20 ^s	39.7 ["]
10.7	11.76 ³¹	20.5 ²⁰	46.23 ⁴⁹	60.1 ⁰	33.02 ⁵⁶	78.0 ¹	39.51 ³¹	37.8 ¹⁹
20.6	12.04 ²⁸	18.7 ¹⁸	46.68 ⁴⁵	60.7 ⁶	33.52 ⁵⁰	78.8 ⁸	39.80 ²⁹	36.1 ¹⁷
30.6	12.28 ²⁴	17.1 ¹⁶	47.06 ³⁸	61.7 ¹⁰	33.96 ⁴⁴	80.0 ¹²	40.04 ²⁴	34.7 ¹⁴
Feb. 9.6	12.48 ²⁰	15.8 ¹³	47.37 ³¹	63.2 ¹⁵	34.31 ³⁵	81.7 ¹⁷	40.24 ²⁰	33.6 ¹¹
	15	10	23	19	26	21	16	8
19.5	12.63	14.8	47.60	65.1	34.57	83.8	40.40	32.8
Mar. 1.5	12.73 ¹⁰	14.0 ⁸	47.75 ¹⁵	67.3 ²²	34.74 ¹⁷	86.2 ²⁴	40.51 ¹¹	32.2 ⁶
	6	5	7	23	7	26	6	3
11.5	12.79	13.5 ³	47.82 ⁷	69.6 ²³	34.81 ⁷	88.8 ²⁶	40.57 ²	31.9 ⁰
21.5	12.81 ²	13.2 ³	47.81 ¹	72.1 ²⁵	34.79 ²	91.4 ²⁶	40.59 ²	31.9 ⁰
31.4	12.79 ²	13.1 ¹	47.73 ⁸	74.5 ²⁴	34.69 ¹⁰	93.9 ²⁵	40.58 ¹	32.0 ¹
	5	1	15	22	18	24	5	3
Apr. 10.4	12.74	13.2	47.58	76.7	34.51	96.3	40.53	32.3
20.4	12.67 ⁷	13.5 ³	47.39 ¹⁹	78.8 ²¹	34.27 ²⁴	98.4 ²¹	40.46 ⁷	32.7 ⁴
30.4	12.58 ⁹	13.8 ³	47.16 ²³	80.5 ¹⁷	33.98 ²⁹	100.2 ¹⁸	40.37 ⁹	33.2 ⁵
May 10.3	12.49 ⁹	14.3 ⁵	46.90 ²⁶	81.9 ¹⁴	33.67 ³¹	101.6 ¹⁴	40.28 ⁹	33.8 ⁶
20.3	12.39 ¹⁰	14.8 ⁵	46.63 ²⁷	82.8 ⁹	33.33 ³⁴	102.6 ¹⁰	40.17 ¹¹	34.4 ⁶
	11	5	27	5	34	4	10	6
30.3	12.28	15.3	46.36	83.3	32.99	103.0	40.07	35.0
June 9.2	12.18 ¹⁰	15.9 ⁶	46.09 ²⁷	83.4 ¹	32.66 ³³	103.0 ⁰	39.97 ¹⁰	35.6 ⁶
19.2	12.09 ⁹	16.5 ⁶	45.84 ²⁵	83.0 ⁴	32.34 ³²	102.6 ⁴	39.88 ⁹	36.1 ⁵
29.2	12.01 ⁸	17.0 ⁵	45.61 ²³	82.2 ⁸	32.05 ²⁹	101.6 ¹⁰	39.79 ⁹	36.6 ⁵
July 9.2	11.94 ⁷	17.5 ⁵	45.41 ²⁰	81.0 ¹²	31.80 ²⁵	100.2 ¹⁴	39.72 ⁷	37.0 ⁴
	5	5	16	16	21	18	6	3
19.1	11.89	18.0	45.25	79.4	31.59	98.4	39.66	37.3
29.1	11.85 ⁴	18.3 ³	45.12 ¹³	77.4 ²⁰	31.42 ¹⁷	96.2 ²²	39.62 ⁴	37.5 ²
Aug. 8.1	11.83 ²	18.6 ³	45.04 ⁸	75.1 ²³	31.30 ¹²	93.7 ²⁵	39.60 ²	37.6 ¹
18.1	11.84 ¹	18.8 ²	45.00 ⁴	72.5 ²⁶	31.24 ⁶	90.9 ²⁸	39.60 ⁰	37.5 ¹
28.0	11.87 ³	18.8 ⁰	45.02 ²	69.7 ²⁸	31.24 ⁰	87.8 ³¹	39.63 ³	37.3 ²
	6	2	6	30	6	32	5	4
Sept. 7.0	11.93	18.6	45.08	66.7	31.30	84.6	39.68	36.9
17.0	12.02 ⁹	18.2 ⁴	45.20 ¹²	63.5 ³²	31.43 ¹³	81.3 ³³	39.77 ⁹	36.3 ⁶
26.9	12.14 ¹²	17.6 ⁶	45.38 ¹⁸	60.3 ³²	31.62 ¹⁹	77.9 ³⁴	39.89 ¹²	35.4 ⁹
Oct. 6.9	12.30 ¹⁶	16.7 ⁹	45.61 ²³	57.1 ³²	31.88 ²⁶	74.5 ³⁴	40.04 ¹⁵	34.4 ¹⁰
16.9	12.49 ¹⁹	15.6 ¹¹	45.91 ³⁰	53.9 ³²	32.21 ³³	71.2 ³³	40.23 ¹⁹	33.1 ¹³
	24	14	35	31	40	31	23	16
26.9	12.73	14.2	46.26	50.8	32.61	68.1	40.46	31.5
Nov. 5.8	12.99 ²⁶	12.5 ¹⁷	46.67 ⁴¹	47.9 ²⁹	33.06 ⁴⁵	65.1 ³⁰	40.72 ²⁶	29.7 ¹⁸
15.8	13.28 ²⁹	10.7 ¹⁸	47.12 ⁴⁵	45.3 ²⁶	33.57 ⁵¹	62.5 ²⁶	41.01 ²⁹	27.8 ¹⁹
25.8	13.60 ³²	8.7 ²⁰	47.61 ⁴⁹	43.0 ²³	34.13 ⁵⁶	60.3 ²²	41.33 ³²	25.7 ²¹
Dec. 5.8	13.94 ³⁴	6.6 ²¹	48.13 ⁵²	41.2 ¹⁸	34.71 ⁵⁸	58.5 ¹³	41.67 ³⁴	23.6 ²¹
	34	22	53	14	60	13	34	22
15.7	14.28	4.4	48.66	39.8	35.31	57.2	42.01	21.4
25.7	14.61 ³³	2.3 ²¹	49.18 ⁵²	38.9 ⁹	35.91 ⁶⁰	56.4 ⁸	42.35 ³⁴	19.3 ²¹
35.7	14.93 ³²	0.2 ²¹	49.69 ⁵¹	38.6 ³	36.49 ⁵⁸	56.3 ¹	42.67 ³²	17.4 ¹⁹
Sec δ, Tan δ	1.003	+0.071	1.828	+1.530	2.145	+1.897	1.009	+0.137
Mean Place	10 ^h .282	26 ^m .68	43 ^m .315	77 ^m .88	29 ^m .677	96 ^m .50	38 ^m .013	45 ^m .22
D'ψ α, Dω α	0.00	0.00	+0.01	+0.10	+0.01	+0.12	0.00	+0.01
Dψ δ, Dω δ	-0.4	+0.3	-0.4	+0.3	-0.4	+0.3	-0.4	+0.3

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	ρ^4 Leonis. Mag. 5.7		ψ Ursæ Majoris. Mag. 3.2		β Crateris. Mag. 4.5		δ Leonis. Mag. 2.6	
	Right Ascension.	Declination N.	Right Ascension.	Declination N.	Right Ascension.	Declination S.	Right Ascension.	Declination N.
	h m 11 2	° ' " + 2 24	h m 11 4	° ' " + 44 56	h m 11 7	° ' " - 22 21	h m 11 9	° ' " + 20 58
Jan. 0.7	35.25	58.4	55.31	79.8	29.43	38.1	36.73	72.4
10.7	35.56 ³¹	56.3 ²¹	55.71 ⁴⁰	79.2 ⁶	29.75 ³²	40.8 ²⁷	37.07 ³⁴	70.9 ¹⁵
20.6	35.84 ²⁸	54.4 ¹⁹	56.08 ³⁷	79.2 ⁰	30.04 ²⁹	43.5 ²⁷	37.37 ³⁰	69.8 ¹¹
30.6	36.08 ²⁴	52.8 ¹⁶	56.40 ³²	79.6 ⁴	30.29 ²⁵	46.2 ²⁷	37.63 ²⁶	69.0 ⁸
Feb. 9.6	36.28 ¹⁵	51.4 ¹⁴	56.67 ²⁷	80.5 ⁹	30.49 ²⁰	48.9 ²⁷	37.86 ²³	68.6 ⁴
19.5	36.43 ¹¹	50.2 ⁹	56.87 ¹⁴	81.8 ¹⁶	30.65 ¹¹	51.4 ²³	38.03 ¹²	68.5 ²
Mar. 1.5	36.54 ⁷	49.3 ⁶	57.01 ⁸	83.4 ¹⁸	30.76 ⁷	53.7 ²¹	38.15 ⁸	68.7 ⁵
11.5	36.61 ²	48.7 ⁴	57.09 ²	85.2 ²⁰	30.83 ²	55.8 ¹⁹	38.23 ³	69.2 ⁸
21.5	36.63 ¹	48.3 ²	57.11 ⁷	87.2 ²⁰	30.85 ¹	57.7 ¹⁵	38.26 ¹	70.0 ⁸
31.4	36.62 ⁵	48.1 ⁰	57.07 ⁹	89.2 ¹⁹	30.84 ⁴	59.2 ¹³	38.25 ⁴	70.8 ¹⁰
Apr. 10.4	36.57 ⁶	48.1 ²	56.98 ¹³	91.1 ¹⁹	30.80 ⁷	60.5 ¹¹	38.21 ⁷	71.8 ¹¹
20.4	36.51 ⁸	48.3 ³	56.85 ¹⁵	93.0 ¹⁶	30.73 ⁹	61.6 ⁷	38.14 ⁹	72.9 ¹⁰
30.4	36.43 ¹⁰	48.6 ⁴	56.70 ¹⁷	94.6 ¹⁴	30.64 ¹¹	62.3 ⁵	38.05 ¹¹	73.9 ⁹
May 10.3	36.33 ¹⁰	49.0 ⁵	56.53 ¹⁸	96.0 ¹⁰	30.53 ¹¹	62.8 ²	37.94 ¹¹	74.8 ⁹
20.3	36.23 ¹⁰	49.5 ⁵	56.35 ¹⁹	97.0 ⁷	30.42 ¹¹	63.0 ¹	37.83 ¹¹	75.7 ⁷
30.3	36.13 ¹⁰	50.0 ⁶	56.16 ¹⁹	97.7 ⁴	30.31 ¹²	62.9 ⁴	37.72 ¹¹	76.4 ⁶
June 9.2	36.03 ⁹	50.6 ⁶	55.97 ¹⁷	98.1 ⁰	30.19 ¹¹	62.5 ⁶	37.61 ¹¹	77.0 ⁴
19.2	35.94 ⁸	51.2 ⁶	55.80 ¹⁶	98.1 ⁴	30.08 ¹¹	61.9 ⁸	37.50 ¹⁰	77.4 ²
29.2	35.86 ⁸	51.8 ⁵	55.64 ¹³	97.7 ⁸	29.97 ⁹	61.1 ¹⁰	37.40 ⁸	77.6 ¹
July 9.2	35.78 ⁶	52.3 ⁵	55.51 ¹²	96.9 ¹¹	29.88 ⁸	60.1 ¹²	37.32 ⁷	77.7 ²
19.1	35.72 ⁴	52.8 ⁴	55.39 ⁸	95.8 ¹⁴	29.80 ⁷	58.9 ¹³	37.25 ⁵	77.5 ⁴
29.1	35.68 ²	53.2 ⁴	55.31 ⁶	94.4 ¹⁸	29.73 ⁴	57.6 ¹⁴	37.20 ³	77.1 ⁵
Aug. 8.1	35.66 ⁰	53.6 ²	55.25 ³	92.6 ²⁰	29.69 ²	56.2 ¹⁵	37.17 ¹	76.6 ⁸
18.1	35.66 ²	53.8 ¹	55.22 ¹	90.6 ²³	29.67 ¹	54.7 ¹⁴	37.16 ²	75.8 ¹⁰
28.0	35.68 ⁵	53.9 ¹	55.23 ⁶	88.3 ²⁵	29.68 ⁴	53.3 ¹³	37.18 ⁴	74.8 ¹²
Sept. 7.0	35.73 ⁸	53.8 ³	55.29 ⁹	85.8 ²⁷	29.72 ⁷	52.0 ¹¹	37.22 ⁸	73.6 ¹⁴
17.0	35.81 ¹²	53.5 ⁵	55.38 ¹⁴	83.1 ²⁸	29.79 ¹²	50.9 ⁹	37.30 ¹²	72.2 ¹⁶
26.9	35.93 ¹⁵	53.0 ⁸	55.52 ¹⁹	80.3 ²⁹	29.91 ¹⁵	50.0 ⁶	37.42 ¹⁵	70.6 ¹⁸
Oct. 6.9	36.08 ¹⁹	52.2 ¹⁰	55.71 ²³	77.4 ²⁹	30.06 ²⁰	49.4 ³	37.57 ¹⁹	68.8 ²⁰
16.9	36.27 ²³	51.2 ¹³	55.94 ²⁸	74.5 ²⁹	30.26 ²⁴	49.1 ¹	37.76 ²³	66.8 ²¹
26.9	36.50 ²⁶	49.9 ¹⁶	56.22 ³³	71.6 ²⁸	30.50 ²⁷	49.2 ⁵	37.99 ²⁷	64.7 ²³
Nov. 5.8	36.76 ²⁹	48.3 ¹⁸	56.55 ³⁶	68.8 ²⁶	30.77 ³¹	49.7 ¹⁰	38.26 ³⁰	62.4 ²³
15.8	37.05 ³¹	46.5 ²⁰	56.91 ⁴⁰	66.2 ²⁴	31.08 ³³	50.7 ¹⁴	38.56 ³²	60.1 ²³
25.8	37.36 ³³	44.5 ²¹	57.31 ⁴²	63.8 ²¹	31.41 ³⁵	52.1 ¹⁸	38.88 ³⁵	57.8 ²²
Dec. 5.8	37.69 ³⁴	42.4 ²²	57.73 ⁴³	61.7 ¹⁷	31.76 ³⁶	53.9 ²⁰	39.23 ³⁵	55.6 ²¹
15.7	38.03 ³⁴	40.2 ²²	58.16 ⁴³	60.0 ¹³	32.12 ³⁵	55.9 ²⁴	39.58 ³⁶	53.5 ¹⁹
25.7	38.37 ³²	38.0 ²¹	58.59 ⁴²	58.7 ⁹	32.47 ³⁴	58.3 ²⁶	39.94 ³⁴	51.6 ¹⁶
35.7	38.69	35.9	59.01	57.8	32.81	60.9	40.28	50.0
Sec δ, Tan δ	1.001	+0.042	1.413	+0.098	1.081	-0.411	1.071	+0.384
Mean Place	34°.123	62''.26	53°.468	95''.81	28°.530	42''.15	35°.433	82''.42
Dϕ α, Dα δ	0.00	0.00	+0.01	+0.06	0.00	-0.03	0.00	+0.02
Dϕ δ, Dδ δ	-0.4	+0.2	-0.4	+0.2	-0.4	+0.2	-0.4	+0.2

[Rph 13]

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	θ Leonis. Mag. 3.4		γ Ursæ Majoris. Mag. 3.7		δ Crateris. Mag. 3.8		σ Leonis. Mag. 4.1	
	Right Ascension.	Declination N.	Right Ascension.	Declination N.	Right Ascension.	Declination S.	Right Ascension.	Declination N.
	h m 11 9	° ' " +15 53	h m 11 13	° ' " +33 32	h m 11 15	° ' " -14 19	h m 11 16	° ' " + 629
Jan. 0.7	48.09	31.1	54.99	76.1	6.29	5.0	46.35	37.7
10.7	48.41 ³²	29.5 ¹⁶	55.35 ³⁶	75.1 ¹⁰	6.61 ³²	7.5 ²⁵	46.67 ³²	35.8 ¹⁹
20.6	48.71 ³⁰	28.1 ¹⁴	55.68 ³³	74.5 ⁶	6.90 ²⁹	10.0 ²⁵	46.96 ²⁹	34.0 ¹⁸
30.6	48.97 ²⁶	27.1 ¹⁰	55.97 ²⁹	74.3 ²	7.15 ²⁵	12.4 ²⁴	47.22 ²⁶	32.5 ¹⁵
Feb. 9.6	49.19 ²²	26.4 ⁷	56.22 ²⁵	74.6 ³	7.36 ²¹	14.6 ²²	47.44 ²²	31.3 ¹²
19.6	49.36 ¹⁷	26.0 ⁴	56.41 ¹⁹	75.2 ⁶	7.53 ¹⁷	16.7 ²¹	47.61 ¹⁷	30.4 ⁹
Mar. 1.5	49.48 ¹²	26.0 ⁰	56.55 ¹⁴	76.2 ¹⁰	7.65 ¹²	18.6 ¹⁹	47.73 ¹²	29.7 ⁷
11.5	49.55 ⁷	26.2 ²	56.64 ⁹	77.4 ¹²	7.72 ⁷	20.2 ¹⁶	47.81 ⁸	29.3 ⁴
21.5	49.58 ³	26.6 ⁴	56.67 ³	78.8 ¹⁴	7.75 ³	21.6 ¹⁴	47.85 ⁴	29.2 ¹
31.4	49.58 ⁰	27.2 ⁶	56.65 ²	80.4 ¹⁶	7.75 ⁰	22.8 ¹²	47.85 ⁰	29.3 ¹
Apr. 10.4	49.54 ⁴	27.9 ⁷	56.60 ⁵	82.0 ¹⁶	7.72 ³	23.7 ⁹	47.82 ³	29.5 ²
20.4	49.47 ⁷	28.7 ⁸	56.51 ⁹	83.5 ¹⁵	7.66 ⁶	24.3 ⁶	47.76 ⁶	29.9 ⁴
30.4	49.38 ⁹	29.6 ⁹	56.40 ¹¹	84.9 ¹⁴	7.59 ⁷	24.7 ⁴	47.69 ⁷	30.4 ⁵
May 10.3	49.28 ¹⁰	30.4 ⁸	56.28 ¹²	86.2 ¹³	7.50 ⁹	24.9 ²	47.60 ⁹	31.0 ⁶
20.3	49.18 ¹¹	31.2 ⁷	56.14 ¹⁴	87.3 ¹¹	7.40 ¹⁰	24.8 ¹	47.51 ¹⁰	31.5 ⁵
30.3	49.07 ¹¹	31.9 ⁶	56.00 ¹⁴	88.1 ⁵	7.29 ¹⁰	24.6 ⁴	47.41 ¹⁰	32.1 ⁶
June 9.3	48.96 ¹⁰	32.5 ⁴	55.86 ¹³	88.6 ³	7.19 ¹⁰	24.2 ⁶	47.31 ¹⁰	32.7 ⁶
19.2	48.86 ⁹	32.9 ³	55.73 ¹²	88.9 ¹	7.09 ¹⁰	23.6 ⁸	47.22 ⁹	33.3 ⁵
29.2	48.77 ⁸	33.2 ²	55.61 ¹¹	88.8 ³	6.99 ⁸	22.8 ⁹	47.13 ⁸	33.8 ⁵
July 9.2	48.69 ⁶	33.4 ¹	55.50 ⁹	88.5 ⁶	6.91 ⁸	21.9 ¹⁰	47.05 ⁶	34.3 ³
19.1	48.63 ⁵	33.5 ²	55.41 ⁷	87.9 ⁹	6.83 ⁶	20.9 ¹⁰	46.99 ⁵	34.6 ³
29.1	48.58 ³	33.3 ³	55.34 ⁵	87.0 ¹²	6.77 ⁴	19.9 ¹¹	46.94 ⁴	34.9 ²
Aug. 8.1	48.55 ¹	33.0 ⁵	55.29 ²	85.8 ¹⁴	6.73 ²	18.8 ¹⁰	46.90 ¹	35.1 ⁰
18.1	48.54 ²	32.5 ⁷	55.27 ¹	84.4 ¹⁷	6.71 ¹	17.8 ¹⁰	46.89 ¹	35.1 ²
28.0	48.56 ⁵	31.8 ⁹	55.28 ⁴	82.7 ¹⁹	6.72 ³	16.8 ⁹	46.90 ⁴	34.9 ³
Sept. 7.0	48.61 ⁸	30.9 ¹¹	55.32 ⁸	80.8 ²¹	6.75 ⁷	15.9 ⁷	46.94 ⁷	34.6 ⁶
17.0	48.69 ¹¹	29.8 ¹³	55.40 ¹¹	78.7 ²³	6.82 ¹¹	15.2 ⁴	47.01 ¹⁰	34.0 ⁸
27.0	48.80 ¹⁵	28.5 ¹⁵	55.51 ¹⁶	76.4 ²⁴	6.93 ¹⁴	14.8 ²	47.11 ¹⁴	33.2 ¹⁰
Oct. 6.9	48.95 ¹⁸	27.0 ¹⁸	55.67 ²⁰	74.0 ²⁶	7.07 ¹⁸	14.6 ¹	47.25 ¹⁸	32.2 ¹²
16.9	49.13 ²³	25.2 ¹⁹	55.87 ²⁴	71.4 ²⁶	7.25 ²³	14.7 ⁵	47.43 ²¹	31.0 ¹⁵
26.9	49.36 ²⁶	23.3 ²¹	56.11 ²⁸	68.8 ²⁶	7.48 ²⁶	15.2 ⁸	47.64 ²⁵	29.5 ¹⁷
Nov. 5.8	49.62 ²⁹	21.2 ²¹	56.39 ³²	66.2 ²⁶	7.74 ²⁹	16.0 ¹²	47.89 ²⁹	27.8 ²⁰
15.8	49.91 ³²	19.1 ²³	56.71 ³⁵	63.6 ²⁴	8.03 ³²	17.2 ¹⁶	48.18 ³¹	25.8 ²⁰
25.8	50.23 ³⁴	16.8 ²²	57.06 ³⁷	61.2 ²²	8.35 ³⁴	18.8 ¹⁹	48.49 ³³	23.8 ²³
Dec. 5.8	50.57 ³⁵	14.6 ²¹	57.43 ³⁸	59.0 ²⁰	8.69 ³⁴	20.7 ²¹	48.82 ³⁴	21.6 ²²
15.7	50.92 ³⁵	12.5 ²⁰	57.81 ³⁹	57.0 ¹⁷	9.03 ³⁴	22.8 ²³	49.16 ³⁴	19.4 ²¹
25.7	51.27 ³³	10.5 ¹⁸	58.20 ³⁷	55.3 ¹³	9.37 ³⁴	25.1 ²⁴	49.50 ³³	17.3 ²¹
35.7	51.60	8.7	58.57	54.0	9.71	27.5	49.83	15.2
See δ , Tan δ	1.040	+0.285	1.200	+0.663	1.032	-0.255	1.006	+0.114
Mean Place	46° 8.59	39° 1.62	53° 5.02	89° 1.97	5° 38.1	6° 1.26	45° 27.0	43° 1.50
$D'\psi a, D_{\omega} a$	0.00	+0.02	0.00	+0.04	0.00	-0.02	0.00	+0.01
$D'\delta, D_{\omega} \delta$	-0.4	+0.2	-0.4	+0.2	-0.4	+0.2	-0.4	+0.2

FOR THE UPPER TRANSIT AT WASHINGTON.

1915	π Centauri. Mag. 4.3		ι Leonis. Mag. 4.0		τ Leonis. Mag. 5.2		λ Draconis. Mag. 4.1	
	Right Ascension.	Declina- tion S.	Right Ascension.	Declina- tion N.	Right Ascension.	Declina- tion N.	Right Ascension.	Declina- tion N.
	h m 11 17	° ' " -54 1	h m 11 19	° ' " +10 59	h m 11 23	° ' " + 3 19	h m 11 26	° ' " +69 47
0.7	8.17	17.7	30.75	44.0	35.00	23.3	25.59	40.0
0.7	8.60 43	20.5 28	31.07 32	42.1 19	35.32 32	21.3 20	26.33 74	40.1 1
0.6	8.99 39	23.6 31	31.37 30	40.5 16	35.61 29	19.4 19	27.01 68	40.8 7
0.6	9.33 34	27.0 34	31.63 26	39.2 13	35.87 26	17.7 17	27.61 60	42.0 12
0.6	9.61 28	30.6 36	31.85 22	38.2 10	36.09 22	16.3 14	28.12 51	43.8 18
	20	36	18	7	18	11	39	22
0.6	9.81	34.2	32.03	37.5	36.27	15.2	28.51	46.0
0.5	9.95 14	37.8 36	32.16 13	37.2 3	36.40 13	14.3 9	28.78 27	48.5 25
0.5	10.03 8	41.3 35	32.24 8	37.1 1	36.48 8	13.7 6	28.93 15	51.3 28
0.5	10.04 1	44.6 33	32.29 5	37.2 1	36.53 5	13.4 3	28.96 3	54.1 28
0.4	10.00 4	47.7 31	32.29 0	37.5 3	36.54 1	13.3 1	28.86 10	56.9 28
	9	28	3	5	2	1	20	27
0.4	9.91	50.5	32.26	38.0	36.52	13.4	28.66	59.6
0.4	9.77 14	53.0 25	32.21 5	38.6 6	36.47 5	13.6 2	28.37 29	62.1 25
0.4	9.60 17	55.1 21	32.13 8	39.3 7	36.40 7	14.0 4	28.00 37	64.2 21
0.3	9.41 19	56.8 17	32.04 9	40.0 7	36.32 8	14.5 5	27.57 43	65.9 17
0.3	9.19 22	58.1 13	31.94 10	40.7 7	36.23 9	15.0 5	27.10 47	67.1 12
	24	7	10	7	10	6	49	7
0.3	8.95	58.8	31.84	41.4	36.13	15.6	26.61	67.8
0.3	8.71 24	59.1 3	31.74 10	42.0 6	36.03 10	16.2 6	26.11 50	68.0 2
0.2	8.47 24	59.0 1	31.65 9	42.6 6	35.94 9	16.7 5	25.62 49	67.7 3
0.2	8.23 24	58.4 6	31.56 9	43.0 4	35.85 9	17.3 6	25.16 46	66.9 8
0.2	8.00 23	57.3 11	31.48 8	43.3 3	35.77 8	17.8 5	24.73 43	65.6 13
	20	15	7	3	7	5	38	18
0.1	7.80	55.8	31.41	43.6	35.70	18.3	24.35	63.8
0.1	7.62 18	54.0 18	31.35 6	43.7 1	35.65 5	18.7 4	24.03 32	61.5 23
0.1	7.47 15	51.8 22	31.32 3	43.6 1	35.61 4	19.0 3	23.77 26	58.9 26
0.1	7.37 10	49.4 24	31.30 2	43.4 2	35.59 2	19.2 2	23.58 19	56.0 29
0.0	7.31 6	46.9 25	31.31 1	42.9 5	35.59 0	19.2 0	23.47 11	52.8 32
	0	25	4	6	3	2	3	35
0.0	7.31	44.4	31.35	42.3	35.62	19.0	23.44	49.3
0.0	7.37 6	41.9 25	31.42 7	41.5 8	35.68 6	18.7 3	23.50 6	45.8 35
0.0	7.50 13	39.5 24	31.52 10	40.5 10	35.78 10	18.1 6	23.65 15	42.1 37
0.9	7.69 19	37.3 22	31.66 14	39.2 13	35.91 13	17.2 9	23.89 24	38.4 37
0.9	7.95 26	35.6 17	31.83 17	37.7 15	36.09 18	16.1 11	24.23 34	34.8 36
	32	14	22	17	21	13	43	34
0.9	8.27	34.2	32.05	36.0	36.30	14.8	24.66	31.4
0.8	8.65 38	33.4 8	32.30 25	34.1 19	36.54 24	13.2 16	25.18 52	28.2 32
0.8	9.08 43	33.2 2	32.58 28	32.0 21	36.82 28	11.4 18	25.77 59	25.3 29
0.8	9.55 47	33.5 3	32.89 31	29.8 22	37.13 31	9.4 20	26.44 67	22.8 25
0.8	10.04 49	34.4 9	33.23 34	27.6 22	37.46 33	7.2 22	27.16 72	20.8 20
	49	15	34	22	34	22	75	15
0.7	10.53	35.9	33.57	25.4	37.80	5.0	27.91	19.3
0.7	11.01 48	38.0 21	33.91 34	23.3 21	38.14 34	2.8 22	28.68 77	18.4 9
0.7	11.48 47	40.5 25	34.25 34	21.4 19	38.46 32	0.7 21	29.43 75	18.1 3
0.6	1.702	-1.377	1.019	+0.194	1.002	+0.058	2.895	+2.717
ce	7 ^h .546	30 ^m .24	29 ^h .634	51 ^m .30	33 ^h .984	28 ^m .29	22 ^h .439	61 ^m .25
a	-0.01	-0.09	0.00	+0.01	0.00	0.00	+0.01	+0.18
δ	-0.4	+0.2	-0.4	+0.2	-0.4	+0.2	-0.4	+0.1

[Eph 15]

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	ξ Hydræ. Mag. 3.7		λ Centauri. Mag. 3.3		ν Leonis. Mag. 4.5		π Chamæleontis. Mag. 5.7	
	Right Ascension.	Declination S.	Right Ascension.	Declination S.	Right Ascension.	Declination S.	Right Ascension.	Declination S.
	h m 11 28	° ' — 31 23	h m 11 31	° ' — 62 32	h m 11 32	° ' — 0 21	h m 11 33	° ' — 75 25
	s 49.82	" 7.8	s 51.53	" 44.0	s 36.73	" 19.6	s 44.87	" 17.7
Jan. 0.7	50.17 ³⁵	10.5 ²⁷	52.07 ⁵⁴	46.6 ²⁶	37.05 ³²	21.8 ²²	45.77 ⁹⁰	20.0 ²³
10.7	50.49 ³²	13.3 ²⁸	52.56 ⁴⁹	49.6 ³⁰	37.35 ³⁰	23.8 ²⁰	46.58 ⁸¹	22.9 ²⁹
20.6	50.77 ²⁸	16.2 ²⁹	52.99 ⁴³	52.9 ³³	37.61 ²⁶	25.6 ¹⁸	47.27 ⁶⁹	26.2 ³³
30.6	51.00 ²³	19.1 ²⁹	53.34 ³⁵	56.4 ³⁵	37.84 ²³	27.2 ¹⁶	47.84 ⁵⁷	29.7 ⁵⁵
Feb. 9.6	51.19 ¹⁹	22.0 ²⁹	53.61 ²⁷	60.1 ³⁷	38.02 ¹⁸	28.6 ¹⁴	48.28 ⁴⁴	33.5 ³⁸
19.6	51.33 ¹⁴	24.8 ²⁸	53.80 ¹⁹	63.9 ³⁸	38.16 ¹⁴	29.7 ¹¹	48.57 ²⁹	37.4 ³⁹
Mar. 1.5	51.42 ⁹	27.4 ²⁶	53.92 ¹²	67.6 ³⁷	38.26 ¹⁰	30.5 ⁸	48.72 ¹⁵	41.3 ³⁹
11.5	51.46 ⁴	29.7 ²³	53.95 ³	71.2 ³⁶	38.31 ⁵	31.1 ⁶	48.74 ²	45.2 ³⁹
21.5	51.47 ¹	31.8 ²¹	53.91 ⁴	74.7 ³⁵	38.33 ²	31.4 ³	48.62 ¹²	48.9 ³⁷
31.5	51.44 ⁶	33.7 ¹⁹	53.81 ¹⁰	77.9 ³²	38.31 ²	31.5 ¹	48.39 ²³	52.5 ³⁶
Apr. 10.4	51.38 ⁸	35.2 ¹⁵	53.65 ¹⁶	80.7 ²⁸	38.27 ⁴	31.4 ¹	48.05 ³⁴	55.7 ³²
20.4	51.30 ⁸	36.4 ¹²	53.44 ²¹	83.2 ²⁵	38.21 ⁶	31.2 ²	47.61 ⁴⁴	58.6 ²⁹
30.4	51.20 ¹⁰	37.3 ⁹	53.19 ²⁵	85.3 ²¹	38.14 ⁷	30.9 ³	47.08 ⁵³	61.1 ²⁵
May 10.3	51.08 ¹²	37.9 ⁶	52.91 ²⁸	87.0 ¹⁷	38.05 ⁹	30.5 ⁴	46.49 ⁵⁹	63.1 ²⁰
20.3	50.96 ¹²	38.2 ³	52.60 ³¹	88.1 ¹¹	37.96 ⁹	29.9 ⁶	45.84 ⁶⁵	64.7 ¹⁶
30.3	50.83 ¹³	38.1 ¹	52.27 ³³	88.8 ⁷	37.87 ⁹	29.4 ⁵	45.15 ⁶⁹	65.7 ¹⁰
June 9.3	50.70 ¹³	37.7 ⁴	51.94 ³³	89.0 ²	37.77 ¹⁰	29.4 ⁶	44.44 ⁷¹	66.2 ⁵
19.2	50.57 ¹³	37.0 ⁷	51.60 ³⁴	88.7 ³	37.68 ⁹	28.2 ⁶	43.72 ⁷²	66.1 ¹
29.2	50.45 ¹²	36.0 ¹⁰	51.27 ³⁰	87.9 ¹³	37.60 ⁸	27.6 ⁶	43.03 ⁶⁶	65.5 ¹¹
July 9.2	50.34 ⁹	34.8 ¹⁴	50.97 ²⁸	86.6 ¹⁸	37.52 ⁶	27.0 ⁵	42.37 ⁶⁰	64.4 ¹⁶
19.2	50.25 ⁸	33.4 ¹⁶	50.69 ²³	84.8 ²⁰	37.46 ⁵	26.5 ⁵	41.77 ⁵¹	62.8 ²¹
Aug. 8.1	50.17 ⁵	31.8 ¹⁷	50.46 ¹⁸	82.8 ²⁴	37.41 ⁵	26.0 ⁵	41.26 ⁴²	60.7 ²⁴
18.1	50.12 ²	30.1 ¹⁸	50.28 ¹²	80.4 ²⁶	37.39 ¹	25.7 ³	40.84 ²⁹	58.3 ²⁷
28.0	50.10 ¹	28.3 ¹⁷	50.16 ⁵	77.8 ²⁷	37.38 ²	25.4 ⁰	40.55 ¹⁶	55.6 ²⁹
Sept. 7.0	50.11 ⁵	26.6 ¹⁶	50.11 ³	75.1 ²⁸	37.40 ⁶	25.4 ¹	40.39 ¹	52.7 ³⁰
17.0	50.16 ¹⁰	25.0 ¹⁴	50.14 ¹¹	72.3 ²⁷	37.46 ⁹	25.5 ⁴	40.38 ¹⁵	49.7 ²⁹
27.0	50.26 ¹⁴	23.6 ¹¹	50.25 ²⁰	69.6 ²⁵	37.55 ¹²	25.9 ⁶	40.53 ³⁰	46.8 ²⁸
Oct. 6.9	50.40 ¹⁸	22.5 ⁸	50.45 ²⁹	67.1 ¹⁸	37.67 ²¹	26.5 ¹²	40.83 ⁴⁷	44.0 ²⁵
16.9	50.58 ²⁴	21.7 ⁴	50.74 ³⁷	65.0 ²¹	37.83 ²¹	27.4 ¹²	41.30 ⁶²	41.5 ²²
26.9	50.82 ²⁸	21.3 ⁰	51.11 ⁴⁵	63.2 ¹²	38.04 ²⁴	28.6 ¹⁴	41.92 ⁷⁴	39.3 ¹⁶
Nov. 5.9	51.10 ³¹	21.3 ⁵	51.56 ⁵¹	62.0 ⁸	38.28 ²⁷	30.0 ¹⁷	42.66 ⁸⁶	37.7 ¹²
15.8	51.41 ³⁴	21.8 ¹⁰	52.07 ⁵⁶	61.2 ¹	38.55 ³⁰	31.7 ¹⁹	43.52 ⁹⁴	36.5 ⁵
25.8	51.75 ³⁷	22.8 ¹⁴	52.63 ⁵⁹	61.1 ¹²	38.85 ³⁴	33.6 ²²	44.46 ¹⁰⁰	36.0 ⁸
Dec. 5.8	52.12 ³⁸	24.2 ¹⁸	53.22 ⁶⁰	61.6 ¹²	39.18 ³³	35.7 ²²	45.45 ¹⁰⁰	36.2 ⁸
15.7	52.50 ³⁷	26.0 ²²	53.82 ⁵⁹	62.8 ¹⁷	39.52 ³⁴	37.9 ²²	46.45 ⁹⁹	37.0 ¹⁴
25.7	52.87 ³⁶	28.2 ²⁵	54.41 ⁵⁷	64.5 ²³	39.86 ³³	40.1 ²²	47.44 ⁹⁵	38.4 ²⁰
35.7	53.23 ³⁶	30.7 ²⁵	54.98 ⁵⁷	66.8 ²³	40.19 ³³	42.3 ²²	48.39 ⁹⁵	40.4 ²⁰
Sec δ , Tan δ	1.172	—0.610	2.169	—1.925	1.000	—0.006	3.975	—3.847
Mean Place	49°.112	14".19	51°.141	58".03	35°.798	15".61	44°.826	33".58
D' ψ α , D ω α	0.00	—0.04	—0.01	—0.13	0.00	0.00	—0.01	—0.25
D' ψ δ , D ω δ	—0.4	+0.1	—0.4	+0.1	—0.4	+0.1	—0.4	+0.1

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	δ Draconis. Mag. 5.5		ζ Crateris. Mag. 4.9		χ Ursæ Majoris. Mag. 3.8		β Leonis. (Denebola.) Mag. 2.2	
	Right Ascension.	Declination N.	Right Ascension.	Declination S.	Right Ascension.	Declination N.	Right Ascension.	Declination N.
	h m 11 37	° ' " +67 12	h m 11 40	° ' " -17 52	h m 11 41	° ' " +48 14	h m 11 44	° ' " +15 2
	s 11 37	" "	s 11 40	" "	s 11 41	" "	s 11 44	" "
Jan. 0.7	47.31 ⁶⁷	33.8 ²	27.89 ³⁴	39.5 ²⁵	35.70 ⁴⁴	43.9 ⁸	44.54 ³³	40.5 ¹⁸
10.7	47.98 ⁶³	33.6 ⁵	28.23 ³¹	42.0 ²⁵	36.14 ⁴¹	43.1 ³	44.87 ³²	38.7 ¹⁵
20.7	48.61 ⁵⁷	34.1 ¹¹	28.54 ²⁷	44.5 ²⁵	36.55 ³⁷	42.8 ³	45.19 ²⁸	37.2 ¹²
30.6	49.18 ⁴⁸	35.2 ¹⁶	28.81 ¹⁹	47.0 ²³	36.92 ²⁶	43.1 ¹³	45.47 ²⁰	36.0 ⁵
Feb. 9.6	49.66 ³⁸	36.8 ²⁰	29.05 ¹⁹	49.3 ²³	37.24 ¹³	43.9 ⁸	45.71 ²⁴	35.1 ⁹
19.6	50.04 ²⁸	38.8 ²⁴	29.24 ¹⁴	51.6 ²¹	37.50 ¹⁹	45.2 ¹⁶	45.91 ¹⁶	34.6 ²
Mar. 1.5	50.32 ¹⁶	41.2 ²⁷	29.38 ¹¹	53.7 ¹⁸	37.69 ¹³	46.8 ¹⁹	46.07 ¹¹	34.4 ¹
11.5	50.48 ⁵	43.9 ²⁸	29.49 ⁶	55.5 ¹⁶	37.82 ⁶	48.7 ²²	46.18 ⁶	34.5 ⁴
21.5	50.53 ⁵	46.7 ²⁸	29.55 ³	57.1 ¹⁴	37.88 ¹	50.9 ²²	46.24 ³	34.9 ⁶
31.5	50.48 ¹⁵	49.5 ²⁷	29.58 ¹	58.5 ¹¹	37.89 ⁵	53.1 ²³	46.27 ¹	35.5 ⁷
Apr. 10.4	50.33 ²³	52.2 ²⁵	29.57 ⁴	59.6 ⁹	37.84 ¹⁰	55.4 ²¹	46.26 ⁴	36.2 ⁹
20.4	50.10 ³⁰	54.7 ²²	29.53 ⁶	60.5 ⁶	37.74 ¹⁴	57.5 ²⁰	46.22 ⁶	37.1 ⁹
30.4	49.80 ³⁶	56.9 ¹⁸	29.47 ⁷	61.1 ⁴	37.60 ¹⁶	59.5 ¹⁷	46.16 ⁷	38.0 ⁹
May 10.4	49.44 ⁴⁰	58.7 ¹⁴	29.40 ⁹	61.5 ²	37.44 ¹⁹	61.2 ¹¹	46.09 ¹⁰	38.9 ⁹
20.3	49.04 ⁴²	60.1 ⁹	29.31 ¹⁰	61.7 ¹	37.25 ²⁰	62.6 ¹¹	46.00 ¹⁰	39.8 ⁸
30.3	48.62 ⁴³	61.0 ⁴	29.21 ¹⁰	61.6 ³	37.05 ²⁰	63.7 ⁷	45.90 ¹⁰	40.6 ⁸
June 9.3	48.19 ⁴³	61.4 ¹	29.11 ¹⁰	61.3 ⁴	36.85 ²⁰	64.4 ³	45.80 ¹¹	41.4 ⁶
19.2	47.76 ⁴¹	61.3 ⁷	29.01 ¹⁰	60.9 ⁷	36.65 ¹⁹	64.7 ²	45.69 ¹⁰	42.0 ⁴
29.2	47.35 ³⁸	60.6 ¹¹	28.91 ¹⁰	60.2 ⁸	36.46 ¹⁸	64.5 ¹⁰	45.59 ⁹	42.4 ³
July 9.2	46.97 ³⁵	59.5 ¹⁶	28.81 ⁹	59.4 ¹⁰	36.28 ¹⁷	64.0 ¹⁰	45.50 ⁹	42.7 ²
19.2	46.62 ³⁰	57.9 ²⁰	28.72 ⁸	58.4 ¹⁰	36.11 ¹⁴	63.0 ¹³	45.41 ⁷	42.9 ¹
29.1	46.32 ²⁵	55.9 ²⁵	28.64 ⁶	57.4 ¹¹	35.97 ¹¹	61.7 ¹⁷	45.34 ⁶	42.8 ²
Aug. 8.1	46.07 ¹⁹	53.4 ²⁸	28.58 ⁴	56.3 ¹²	35.86 ⁸	60.0 ²⁰	45.28 ⁴	42.6 ⁴
18.1	45.88 ¹²	50.6 ³¹	28.54 ²	55.1 ¹¹	35.78 ⁵	58.0 ²⁴	45.24 ²	42.2 ⁶
28.1	45.76 ⁵	47.5 ³³	28.52 ¹	54.0 ¹⁰	35.73 ¹	55.6 ²⁶	45.22 ¹	41.6 ⁹
Sept. 7.0	45.71 ³	44.2 ³⁵	28.53 ⁴	53.0 ⁹	35.72 ⁴	53.0 ²⁸	45.23 ⁴	40.7 ¹⁰
17.0	45.74 ¹¹	40.7 ³⁶	28.57 ⁸	52.1 ⁷	35.76 ⁸	50.2 ³⁰	45.27 ⁸	39.7 ¹³
27.0	45.85 ¹⁹	37.1 ³⁶	28.65 ¹²	51.4 ⁴	35.84 ¹³	47.2 ³¹	45.35 ¹¹	38.4 ¹⁶
Oct. 6.9	46.04 ²⁸	33.5 ³⁷	28.77 ¹⁶	51.0 ¹	35.97 ¹⁹	44.1 ³²	45.46 ¹⁵	36.8 ¹⁷
16.9	46.32 ³⁶	29.8 ³⁵	28.93 ²¹	50.9 ³	36.16 ²⁴	40.9 ³²	45.61 ¹⁹	35.1 ²⁰
26.9	46.68 ⁴⁴	26.3 ³³	29.14 ²⁵	51.2 ⁶	36.40 ²⁹	37.7 ³¹	45.80 ²³	33.1 ²¹
Nov. 5.9	47.12 ⁵²	23.0 ³⁰	29.39 ²⁸	51.8 ⁹	36.69 ³⁵	34.6 ³⁰	46.03 ²⁷	31.0 ²²
15.8	47.64 ⁵⁹	20.0 ²⁶	29.67 ³¹	52.7 ¹⁴	37.04 ³⁸	31.6 ²⁷	46.30 ³⁰	28.8 ²³
25.8	48.23 ⁶⁴	17.4 ²²	29.98 ³⁴	54.1 ¹⁷	37.42 ⁴²	28.9 ²¹	46.60 ³⁴	26.5 ²³
Dec. 5.8	48.87 ⁶⁸	15.2 ¹⁷	30.32 ³⁵	55.8 ¹⁹	37.84 ⁴⁴	26.5 ²¹	46.93 ³⁴	24.2 ²³
15.8	49.55 ⁶⁹	13.5 ¹²	30.67 ³⁵	57.7 ²²	38.28 ⁴⁵	24.4 ¹⁶	47.27 ³⁵	21.9 ²¹
25.7	50.24 ⁶⁸	12.3 ⁵	31.02 ³⁵	59.9 ²⁴	38.73 ⁴⁵	22.8 ¹¹	47.62 ³⁴	19.8 ²¹
35.7	50.92 ⁶⁸	11.8 ⁵	31.37 ³⁵	62.3 ²⁴	39.18 ⁴⁵	21.7 ¹¹	47.96 ³⁴	17.8 ²⁰
Sec δ , Tan δ	2.582	+2.380	1.051	-0.323	1.502	+1.120	1.035	+0.269
Mean Place	44°.648	55°.43	27°.154	41°.26	34°.089	62°.66	43°.528	50°.16
D ϕ α , D α α	+0.01	+0.16	0.00	-0.02	0.00	+0.07	0.00	+0.02
D ϕ δ , D α δ	-0.4	+0.1	-0.4	+0.1	-0.4	+0.1	-0.4	+0.1

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	β Virginis. Mag. 3.8		Groombridge 1830. Mag. 6.5		γ Ursæ Majoris. Mag. 2.5		π Virginis. Mag. 4.0	
	Right Ascension.	Declination N.	Right Ascension.	Declination N.	Right Ascension.	Declination N.	Right Ascension.	Declination N.
	h m 11 46	° ' " + 2 14	h m 11 48	° ' " + 38 18	h m 11 49	° ' " + 54 9	h m 11 56	° ' " + 7 4
Jan. 0.7	16.93	32.4	6.39	87.0	23.74	42.2	31.89	70.5
10.7	17.26 ³³	30.2 ²²	6.79 ⁴⁰	85.6 ¹⁴	24.23 ⁴⁹	41.5 ⁷	32.22 ³³	68.4 ²¹
20.7	17.57 ³¹	28.3 ¹⁹	7.17 ³⁸	84.8 ⁸	24.68 ⁴⁵	41.4 ¹	32.53 ³¹	66.6 ¹⁸
30.6	17.85 ²⁸	26.5 ¹⁸	7.51 ³⁴	84.4 ⁴	25.10 ⁴²	41.8 ⁴	32.82 ²⁹	65.1 ¹⁵
Feb. 9.6	18.08 ²³	25.0 ¹⁵	7.81 ³⁰	84.6 ²	25.46 ³⁶	42.8 ¹⁰	33.07 ²⁵	63.8 ¹³
	20	12	25	5	30	15	20	10
19.6	18.28	23.8	8.06	85.1	25.76	44.3	33.27	62.8
Mar. 1.6	18.44 ¹⁶	22.9 ⁹	8.25 ¹⁹	86.1 ¹⁰	25.98 ²²	46.1 ¹⁸	33.44 ¹⁷	62.1 ⁷
11.5	18.55 ¹¹	22.2 ⁷	8.38 ¹³	87.4 ¹³	26.13 ¹⁵	48.3 ²²	33.56 ¹²	61.8 ³
21.5	18.62 ⁷	21.8 ⁴	8.46 ⁸	88.9 ¹⁵	26.20 ⁷	50.7 ²⁴	33.64 ⁸	61.7 ¹
31.5	18.65 ³	21.6 ²	8.49 ³	90.6 ¹⁷	26.21 ¹	53.1 ²⁴	33.68 ⁴	61.8 ¹
	0	0	1	17	5	25	0	3
Apr. 10.4	18.65	21.6	8.48	92.3	26.16	55.6	33.68	62.1
20.4	18.62 ³	21.8 ²	8.42 ⁶	94.0 ¹⁷	26.05 ¹¹	58.0 ²⁴	33.66 ²	62.6 ⁵
30.4	18.57 ⁵	22.2 ⁴	8.34 ⁸	95.6 ¹⁶	25.89 ¹⁶	60.1 ²¹	33.62 ⁴	63.2 ⁶
May 10.4	18.51 ⁶	22.6 ⁴	8.23 ¹¹	97.1 ¹⁵	25.69 ²⁰	62.0 ¹⁹	33.55 ⁷	63.8 ⁶
20.3	18.43 ⁸	23.1 ⁵	8.10 ¹³	98.3 ¹²	25.47 ²²	63.5 ¹⁵	33.48 ⁷	64.5 ⁷
	9	6	14	10	23	12	9	7
30.3	18.34	23.7	7.96	99.3	25.24	64.7	33.39	65.2
June 9.3	18.25	24.3	7.82 ¹⁴	99.9 ⁶	24.99 ²⁵	65.4 ⁷	33.30 ⁹	65.9 ⁷
19.3	18.16 ⁹	24.9 ⁶	7.68 ¹⁴	100.2 ³	24.75 ²⁴	65.6 ²	33.20 ¹⁰	66.6 ⁷
29.2	18.07 ⁹	25.5 ⁶	7.54 ¹⁴	100.2 ⁰	24.51 ²⁴	65.4 ²	33.11 ⁹	67.1 ⁵
July 9.2	17.98 ⁷	26.0 ⁵	7.41 ¹³	99.8 ⁴	24.29 ²¹	64.8 ¹¹	33.02 ⁸	67.6 ⁴
	7	5	12	7	21	11	8	4
19.2	17.91 ⁷	26.5 ⁴	7.29 ¹⁰	99.1 ¹¹	24.08 ¹⁸	63.7 ¹⁴	32.94 ⁸	68.0 ³
29.1	17.84 ⁶	26.9 ⁴	7.19 ⁸	98.0 ¹¹	23.90 ¹⁵	62.3 ¹⁹	32.86 ⁶	68.3 ¹
Aug. 8.1	17.78 ³	27.2 ³	7.11 ⁶	96.6 ¹⁴	23.75 ¹²	60.4 ²³	32.80 ⁵	68.4 ⁰
18.1	17.75 ²	27.4 ¹	7.05 ³	94.9 ²⁰	23.63 ⁸	58.1 ²⁵	32.75 ³	68.4 ²
28.1	17.73 ¹	27.5 ¹	7.02 ⁰	92.9 ²³	23.55 ³	55.6 ²⁹	32.72 ¹	68.2 ⁴
Sept. 7.0	17.74	27.4	7.02	90.6	23.52	52.7	32.73	67.8
17.0	17.78 ⁴	27.1 ³	7.07 ⁵	88.1 ²⁵	23.54 ²	49.7 ³⁰	32.75 ²	67.2 ⁸
27.0	17.86 ⁸	26.6 ⁵	7.15 ⁸	85.4 ²⁷	23.61 ⁷	46.5 ³²	32.82 ⁷	66.4 ¹¹
Oct. 7.0	17.97 ¹¹	25.8 ⁸	7.27 ¹²	82.5 ²⁹	23.74 ¹³	43.1 ³⁴	32.92 ¹⁰	65.3 ¹³
16.9	18.12 ¹⁵	24.8 ¹⁰	7.44 ¹⁷	79.5 ³⁰	23.93 ¹⁹	39.7 ³³	33.06 ¹⁴	64.0 ¹⁵
	19	13	22	31	25	33	18	15
26.9	18.31	23.5	7.66	76.4	24.18	36.4	33.24	62.5
Nov. 5.9	18.54 ²³	21.9 ¹⁶	7.93 ²⁷	73.4 ³⁰	24.49 ³¹	33.1 ³³	33.46 ²²	60.7 ¹⁸
15.8	18.81 ²⁷	20.1 ¹⁸	8.24 ³¹	70.3 ³¹	24.85 ³⁶	30.0 ³¹	33.72 ²⁶	58.8 ¹⁹
25.8	19.11 ³⁰	18.2 ¹⁹	8.58 ³⁴	67.4 ²⁹	25.27 ⁴²	27.2 ²⁸	34.01 ²⁹	56.7 ²¹
Dec. 5.8	19.43 ³²	16.0 ²²	8.96 ³⁸	64.8 ²⁶	25.72 ⁴⁵	24.7 ²⁵	34.33 ³²	54.4 ²²
	34	22	40	24	48	21	33	22
15.8	19.77	13.8	9.36	62.4	26.20	22.6	34.66	52.2
25.7	20.11 ³⁴	11.6 ²²	9.77 ⁴¹	60.4 ²⁰	26.69 ⁴⁹	21.1 ¹⁵	35.00 ³⁴	50.0 ²¹
35.7	20.45 ³⁴	9.4 ²²	10.18 ⁴¹	58.8 ¹⁶	27.19 ⁵⁰	20.0 ¹¹	35.34 ³⁴	47.9 ²
Sec δ , Tan δ	1.001	+0.039	1.275	+0.790	1.708	+1.385	1.008	+0.124
Mean Place	16°.060	37''.73	5°.075	103''.70	22°.014	62''.51	31°.032	77''.87
$D'\psi\alpha$, $D\mu\alpha$	0.00	0.00	0.00	+0.05	0.00	+0.09	0.00	+0.01
$D\psi\delta$, $D\mu\delta$	-0.4	+0.1	-0.4	+0.1	-0.4	0.0	-0.4	0.0

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	♍ Virginis. Mag. 4.2		♋ Centauri. Mag. 2.9		♌ Corvi. Mag. 3.2		♉ H. Draconis. Mag. 5.1	
	Right Ascension.	Declination N.	Right Ascension.	Declination S.	Right Ascension.	Declination S.	Right Ascension.	Declination N.
	h m 12 0	° ' " + 9 11	h m 12 3	° ' " - 50 14	h m 12 5	° ' " - 22 8	h m 12 8	° ' " + 78 4
in. 0.7	53.64	69.7	57.07	46.2	45.60	47.0	17.60	54.7
10.7	53.98 ³⁴	67.7 ²⁰	57.52 ⁴⁵	48.5 ²³	45.95 ³⁵	49.4 ²⁴	18.77 ¹¹⁷	54.5 ²
20.7	54.29 ³¹	65.9 ¹⁸	57.94 ⁴²	51.2 ²⁷	46.28 ³³	51.9 ²⁵	19.90 ¹¹³	54.9 ⁴
30.6	54.58 ²⁹	64.4 ¹⁵	58.32 ³⁸	54.2 ³⁰	46.58 ³⁰	54.4 ²⁵	20.94 ¹⁰⁴	55.9 ¹⁰
b. 9.6	54.83 ²⁵	63.3 ¹¹	58.65 ³³	57.4 ³²	46.84 ²⁶	56.9 ²⁵	21.85 ⁹¹	57.6 ¹⁷
19.6	55.04 ²¹	62.4 ⁹	58.92 ²⁷	60.7 ³³	47.06 ²²	59.3 ²⁴	22.61 ⁷⁶	59.7 ²¹
ir. 1.6	55.21 ¹⁷	61.9 ⁵	59.14 ²²	64.1 ³⁴	47.23 ¹⁷	61.5 ²²	23.19 ⁵⁸	62.2 ²⁵
11.5	55.34 ¹³	61.6 ³	59.29 ¹⁵	67.4 ³³	47.36 ¹³	63.6 ²¹	23.57 ³⁸	65.0 ²⁸
21.5	55.42 ⁸	61.6 ⁰	59.39 ¹⁰	70.6 ³²	47.45 ⁹	65.5 ¹⁹	23.74 ¹⁷	68.0 ³⁰
31.5	55.46 ⁴	61.9 ³	59.44 ⁵	73.6 ³⁰	47.51 ⁶	67.1 ¹⁶	23.72 ²	71.0 ³⁰
r. 10.5	55.48 ²	62.3 ⁶	59.44 ⁰	76.5 ²⁹	47.53 ²	68.5 ¹⁴	23.50 ²²	74.0 ³⁰
20.4	55.46 ²	62.9 ⁶	59.39 ⁵	79.0 ²⁵	47.52 ¹	69.6 ¹¹	23.11 ³⁹	76.8 ²⁸
30.4	55.41 ⁵	63.6 ⁷	59.31 ⁸	81.2 ²²	47.48 ⁴	70.5 ⁹	22.57 ⁵⁴	79.3 ²⁵
y 10.4	55.35 ⁶	64.4 ⁸	59.19 ¹²	83.1 ¹⁹	47.42 ⁶	71.1 ⁶	21.89 ⁶⁸	81.4 ²¹
20.3	55.28 ⁷	65.2 ⁸	59.05 ¹⁴	84.7 ¹⁶	47.34 ⁸	71.5 ⁴	21.11 ⁷⁸	83.0 ¹⁶
30.3	55.19 ⁹	65.9 ⁷	58.88 ¹⁷	85.8 ¹¹	47.26 ⁸	71.7 ²	20.26 ⁸⁵	84.2 ¹²
ie 9.3	55.10 ⁹	66.6 ⁷	58.70 ¹⁸	86.4 ⁶	47.16 ¹⁰	71.6 ¹	19.36 ⁹⁰	84.8 ⁶
19.3	55.00 ¹⁰	67.3 ⁷	58.50 ²⁰	86.7 ³	47.05 ¹¹	71.3 ³	18.44 ⁹²	84.8 ⁰
29.2	54.90 ¹⁰	67.9 ⁶	58.29 ²¹	86.5 ²	46.95 ²	70.8 ⁵	17.53 ⁹¹	84.3 ⁵
y 9.2	54.81 ⁹	68.3 ⁴	58.08 ²¹	85.9 ⁶	46.84 ¹¹	70.0 ⁸	16.65 ⁸⁸	83.3 ¹⁰
19.2	54.72 ⁸	68.7 ²	57.88 ²⁰	84.9 ¹⁰	46.73 ¹¹	69.1 ⁹	15.82 ⁸³	81.8 ¹⁵
29.2	54.64 ⁸	68.9 ²	57.70 ¹⁸	83.5 ¹⁴	46.64 ⁹	68.1 ¹⁰	15.06 ⁷⁶	79.7 ²¹
g. 8.1	54.58 ⁶	68.9 ⁰	57.53 ¹⁷	81.8 ¹⁷	46.55 ⁹	66.9 ¹²	14.39 ⁶⁷	77.2 ²⁵
18.1	54.53 ⁵	68.8 ¹	57.39 ¹⁴	79.8 ²⁰	46.48 ⁷	65.7 ¹²	13.83 ⁵⁶	74.4 ²⁸
28.1	54.50 ³	68.5 ³	57.29 ¹⁰	77.6 ²²	46.44 ⁴	64.5 ¹²	13.38 ⁴⁵	71.2 ³²
38.1	54.47 ¹	68.3 ⁵	57.19 ⁶	76.3 ²³	46.39 ²	64.1 ¹²	13.07 ³¹	67.7 ³⁵
st. 7.0	54.49 ²	68.0 ⁷	57.23 ⁰	75.3 ²³	46.42 ²	63.3 ¹¹	13.07 ¹⁷	67.7 ³⁷
17.0	54.51 ⁶	67.3 ⁹	57.23 ⁵	73.0 ²³	46.44 ²	62.2 ¹¹	12.90 ¹⁷	64.0 ³⁷
27.0	54.57 ¹⁰	66.4 ¹²	57.28 ¹²	70.7 ²³	46.49 ⁵	61.3 ⁹	12.88 ²	60.2 ³⁸
t. 7.0	54.67 ¹⁰	65.2 ¹²	57.40 ¹⁸	68.6 ²¹	46.59 ¹⁰	60.6 ⁷	13.02 ¹⁴	56.3 ³⁹
16.9	54.80 ¹³	63.8 ¹⁷	57.58 ²⁵	66.8 ¹⁸	46.73 ¹⁹	60.2 ⁴	13.31 ²⁹	52.5 ³⁸
26.9	54.98 ¹⁸	62.1 ¹⁸	57.83 ³¹	65.3 ¹⁵	46.92 ¹⁴	60.1 ¹	13.77 ⁴⁶	48.7 ³⁸
v. 5.9	55.20 ²²	60.3 ¹⁸	58.14 ³¹	64.2 ¹¹	47.15 ²³	60.4 ³	14.39 ⁶²	45.2 ³⁵
15.9	55.45 ²⁵	58.2 ²¹	58.51 ³⁷	63.6 ⁶	47.42 ²⁷	61.1 ⁷	15.16 ⁷⁷	42.0 ³²
25.8	55.74 ²⁹	56.0 ²²	58.92 ⁴¹	63.6 ⁰	47.73 ³¹	62.1 ¹⁰	16.06 ⁹⁰	39.1 ²⁹
c. 5.8	56.06 ³²	53.8 ²²	59.37 ⁴⁵	64.1 ⁵	48.07 ³⁴	63.5 ¹⁴	17.08 ¹⁰²	36.7 ²⁴
15.8	56.39 ³³	51.5 ²³	59.83 ⁴⁶	65.1 ¹⁰	48.42 ³⁵	65.3 ¹⁸	18.19 ¹¹¹	34.8 ¹⁹
25.7	56.73 ³⁴	49.3 ²²	60.30 ⁴⁷	66.7 ¹⁶	48.78 ³⁶	67.3 ²⁰	19.34 ¹¹⁵	33.5 ¹³
35.7	57.07 ³⁴	47.2 ²¹	60.77 ⁴⁷	68.8 ²¹	49.14 ³⁶	69.6 ²³	20.52 ¹¹⁸	32.9 ⁶
tan δ	1.013	+0.162	1.564	-1.202	1.080	-0.407	4.843	+4.738
Place	52°.794	77°.97	56°.796	57°.05	45°.044	49°.52	13°.957	78°.74
D _α	0.00	+0.01	0.00	-0.08	0.00	-0.03	0.00	+0.32
D _δ	-0.4	0.0	-0.4	0.0	-0.4	0.0	-0.4	0.0

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	δ Crucis. Mag. 3.1		δ Ursæ Majoris. Mag. 3.4		γ Corvi. Mag. 2.8		ϵ Canum Venat. Mag. 5.8	
	Right Ascension.	Declination S.	Right Ascension.	Declination N.	Right Ascension.	Declination S.	Right Ascension.	Declination N.
	h m 12 10	° ' " — 58 16	h m 12 11	° ' " + 57 29	h m 12 11	° ' " — 17 4	h m 12 11	° ' " + 41 7
Jan. 0.7	37.79	22.7	15.23	55.7	26.51	11.2	53.49	41.0
10.7	38.32 ⁵³	24.8 ²¹	15.76 ⁵³	54.8 ⁹	26.85 ³⁴	13.5 ²³	53.90 ⁴¹	39.7 ¹³
20.7	38.81 ⁴⁹	27.4 ²⁶	16.26 ⁵⁰	54.6 ²	27.18 ³³	15.9 ²⁴	54.29 ³⁹	38.9 ⁸
30.6	39.26 ⁴⁵	30.4 ³⁰	16.72 ⁴⁶	54.9 ³	27.47 ²⁹	18.3 ²⁴	54.64 ³⁵	38.6 ³
Feb. 9.6	39.65 ³⁹	33.6 ³²	17.13 ⁴¹	55.9 ¹⁰	27.73 ²⁶	20.6 ²³	54.96 ³²	38.8 ²
	32 ³⁵	35	34	14	22	21	27	8
19.6	39.97	37.1	17.47	57.3	27.95	22.7	55.23	39.6
Mar. 1.6	40.23 ²⁶	40.6 ³⁵	17.74 ²⁷	59.2 ¹⁹	28.13	24.7 ²⁰	55.44 ²¹	40.7 ¹¹
11.5	40.42 ¹⁹	44.1 ³⁵	17.94 ²⁰	61.4 ²²	28.27 ¹⁴	26.5 ¹⁸	55.60 ¹⁶	42.2 ¹⁵
21.5	40.54 ¹²	47.6 ³⁵	18.05 ¹¹	63.9 ²⁵	28.37 ¹⁰	28.1 ¹⁶	55.70 ¹⁰	44.0 ¹⁸
31.5	40.60 ⁶	50.9 ³³	18.09 ⁴	66.5 ²⁶	28.43 ⁶	29.4 ¹³	55.75 ⁵	46.0 ²⁰
	0	32	3	26	2	11	0	21
Apr. 10.5	40.60	54.1	18.06	69.1	28.45	30.5	55.75	48.1
20.4	40.55 ⁵	57.0 ²⁹	17.96 ¹⁰	71.7 ²⁶	28.45	31.4 ⁹	55.71 ⁴	50.2 ²¹
30.4	40.44 ¹¹	59.6 ²⁶	17.81 ¹⁵	74.1 ²⁴	28.42 ³	32.0 ⁶	55.63 ⁸	52.0 ²⁰
May 10.4	40.29 ¹⁵	61.8 ²²	17.62 ¹⁹	76.1 ²⁰	28.36 ⁶	32.4 ⁴	55.52 ¹¹	54.0 ¹⁸
20.3	40.11 ¹⁸	63.7 ¹⁹	17.39 ²³	77.9 ¹⁸	28.30 ⁶	32.6 ²	55.39 ¹³	55.6 ¹⁶
	22	14	26	14	8	0	15	14
30.3	39.89	65.1	17.13	79.3	28.22	32.6	55.24	57.0
June 9.3	39.65 ²⁴	66.1 ¹⁰	16.86 ²⁷	80.2 ⁹	28.13 ⁹	32.4 ²	55.08 ¹⁶	58.0 ¹⁰
19.3	39.39 ²⁶	66.6 ⁵	16.58 ²⁸	80.7 ⁵	28.03 ¹⁰	32.0 ⁴	54.91 ¹⁷	58.6 ⁶
29.2	39.12 ²⁷	66.7 ¹	16.30 ²⁸	80.7 ⁰	27.93 ¹⁰	31.5 ⁵	54.75 ¹⁶	58.9 ³
July 9.2	38.84 ²⁸	66.3 ⁹	16.03 ²⁷	80.2 ¹⁰	27.83 ¹⁰	30.8 ⁷	54.59 ¹⁵	58.8 ¹
	27	9	26	10	10	8	15	5
19.2	38.57	65.4	15.77	79.2	27.73	30.0	54.44	58.3
29.2	38.32 ²⁵	64.0 ¹⁴	15.54 ²³	77.8 ¹⁴	27.63 ⁸	29.1 ⁹	54.30 ¹⁴	57.5 ⁸
Aug. 8.1	38.09 ²³	62.3 ¹⁷	15.33 ²¹	76.0 ¹⁸	27.55 ⁶	28.1 ¹⁰	54.18 ¹²	56.3 ¹²
18.1	37.89 ²⁰	60.3 ²⁰	15.16 ¹⁷	73.8 ²²	27.49 ⁶	27.1 ¹⁰	54.08 ¹⁰	54.7 ¹⁶
28.1	37.74 ¹⁵	58.0 ²³	15.03 ¹³	71.2 ²⁶	27.44 ⁵	26.1 ¹⁰	54.00 ⁸	52.9 ¹⁸
	9	25	8	29	2	9	4	22
Sept. 7.0	37.65	55.5	14.95	68.3	27.42	25.2	53.96	50.7
17.0	37.61 ⁴	52.9 ²⁶	14.92 ³	65.2 ³¹	27.43 ¹	24.4 ⁸	53.96 ⁰	48.2 ²⁵
27.0	37.65 ⁴	50.4 ²⁵	14.95 ³	61.9 ³³	27.48 ⁵	23.7 ⁷	54.00 ⁴	45.5 ²⁷
Oct. 7.0	37.77 ¹²	47.9 ²⁵	15.04 ⁹	58.4 ³⁵	27.57 ⁹	23.3 ⁴	54.08 ⁸	42.7 ²⁸
16.9	37.97 ²⁰	45.7 ²²	15.19 ¹⁵	54.9 ³⁵	27.70 ¹³	23.2 ¹	54.21 ¹³	39.7 ³⁰
	28	18	22	36	18	2	18	31
26.9	38.25	43.9	15.41	51.3	27.88	23.4	54.39	36.6
Nov. 5.9	38.60 ³⁵	42.4 ¹⁵	15.70 ²⁹	47.9 ³⁴	28.10 ²²	23.9 ⁵	54.63 ²⁴	33.5 ³¹
15.9	39.02 ⁴²	41.4 ¹⁰	16.06 ³⁶	44.6 ³³	28.36 ²⁶	24.8 ⁹	54.91 ²⁸	30.4 ³¹
25.8	39.50 ⁴⁸	41.0 ⁴	16.47 ⁴¹	41.6 ³⁰	28.66 ³⁰	26.0 ¹²	55.24 ³³	27.5 ²⁹
Dec. 5.8	40.02 ⁵²	41.2 ²	16.93 ⁴⁶	38.9 ²⁷	28.98 ³²	27.5 ¹⁵	55.60 ³⁶	24.8 ²⁷
	54	7	50	23	35	19	39	24
15.8	40.56	41.9	17.43	36.6	29.33	29.4	55.99	22.4
25.7	41.11 ⁵⁵	43.3 ¹⁴	17.95 ⁵²	34.9 ¹⁷	29.68 ³⁵	31.5 ²¹	56.40 ⁴¹	20.3 ²¹
35.7	41.66 ⁵⁵	45.1 ¹⁸	18.47 ⁵²	33.6 ¹³	30.03 ³⁵	33.7 ²²	56.81 ⁴¹	18.7 ¹⁰
Sec δ , Tan δ	1.902	-1.618	1.861	+1.570	1.046	-0.307	1.328	+0.873
Mean Place	37° 7' 13"	35° 20'	13° 6' 49"	77° 54'	25° 9' 41"	11° 8' 33"	52° 32' 24"	59° 40'
$D'\psi\alpha$, $D\omega\alpha$	0.00	-0.11	0.00	+0.10	0.00	-0.02	0.00	+0.06
$D'\psi\delta$, $D\omega\delta$	-0.4	0.0	-0.4	0.0	-0.4	0.0	-0.4	-0.1

(Eph 14)

FOR THE UPPER TRANSIT AT WASHINGTON.

on Solar Date.	β Chamæleontis. Mag. 4.4		η Virginis. Mag. 4.0		α^1 Crucis. Mag. 1.6		20 Comæ. Mag. 5.7	
	Right Ascension.	Declination S.	Right Ascension.	Declination S.	Right Ascension.	Declination S.	Right Ascension.	Declination N.
	h m 12 13	° ' -78 50	h m 12 15	° ' - 0 11	h m 12 21	° ' -62 37	h m 12 25	° ' +21 21
n. 0.7	18.80	9.3	34.11	45.7	51.41	28.3	27.99	46.9
10.7	20.03 ¹²³	11.1 ¹⁸	34.45 ³⁴	47.9 ²²	52.01 ⁶⁰	30.3 ²⁰	28.34 ³⁵	45.1 ¹⁸
20.7	21.19 ¹¹⁶	13.4 ²³	34.76 ³¹	49.9 ²⁰	52.57 ⁵⁶	32.7 ²⁴	28.68 ³⁴	43.6 ¹⁵
30.7	22.23 ¹⁰⁴	16.2 ²⁸	35.05 ²⁹	51.8 ¹⁹	53.08 ⁵¹	35.6 ²⁹	28.99 ³¹	42.4 ¹²
b. 9.6	23.13 ⁹⁰	19.4 ³²	35.31 ²⁶	53.4 ¹⁶	53.53 ⁴⁵	38.7 ³¹	29.27 ²⁸	41.7 ⁷
	74	35	22	14	38	34	24	3
19.6	23.87	22.9	35.53	54.8	53.91	42.1	29.51	41.4
ir. 1.6	24.45 ⁵⁸	26.6 ³⁷	35.71 ¹⁸	55.9 ¹¹	54.22 ³¹	45.6 ³⁵	29.71 ²⁰	41.5 ¹
11.5	24.86 ⁴¹	30.5 ³⁹	35.85 ¹⁴	56.7 ⁸	54.45 ²³	49.2 ³⁶	29.87 ¹⁶	41.9 ⁴
21.5	25.10 ²⁴	34.4 ³⁹	35.95 ¹⁰	57.2 ⁵	54.61 ¹⁶	52.8 ³⁶	29.98 ¹¹	42.6 ⁷
31.5	25.17 ⁷	38.2 ³⁸	36.01 ⁶	57.5 ³	54.70 ⁹	56.3 ³⁵	30.04 ⁶	43.6 ¹⁰
	10	38	3	1	1	33	3	12
r. 10.5	25.07	42.0	36.04	57.6	54.71	59.6	30.07	44.8
20.4	24.82	45.5 ³⁵	36.04	57.5 ¹	54.67 ⁴	62.7 ³¹	30.07	46.1 ¹³
30.4	24.42	48.7 ⁴⁰	36.01 ³	57.3 ²	54.56 ¹¹	65.5 ²⁸	30.04 ³	47.4 ¹³
y 10.4	23.89	51.7 ⁵³	35.97 ⁴	56.9 ⁴	54.40 ¹⁶	68.0 ²⁵	29.98	48.7 ¹³
20.4	23.24	54.2 ⁶⁵	35.91 ⁶	56.4 ⁵	54.20 ²⁰	70.1 ²¹	29.91 ⁷	50.0 ¹³
	75	21	8	5	25	17	9	11
30.3	22.49	56.3	35.83	55.9	53.95	71.8	29.82	51.1
ne 9.3	21.66 ⁸³	57.9 ¹⁶	35.75	55.3	53.67	73.0 ¹²	29.72 ¹⁰	52.1 ¹⁰
19.3	20.76 ⁹⁰	58.9 ¹⁰	35.66	54.7	53.37	73.8 ⁸	29.61 ¹¹	52.9 ⁸
29.2	19.83 ⁹³	59.4 ⁵	35.57	54.1	53.05	74.0 ²	29.50 ¹¹	53.5 ⁶
ly 9.2	18.89	59.4 ⁹⁴	35.47 ¹⁰	53.5	52.72	73.8 ²	29.39 ¹¹	53.9 ⁴
	93	6	9	6	33	7	11	1
19.2	17.96	58.8	35.38	52.9	52.39	73.1	29.28	54.0
29.2	17.08	57.7 ⁸⁸	35.30 ⁸	52.4 ⁵	52.07 ³²	71.9 ¹²	29.18 ¹⁰	53.9 ¹
ig. 8.1	16.29	56.1 ⁷⁹	35.22 ⁸	52.0 ⁴	51.79	70.3 ¹⁶	29.09 ⁹	53.5 ⁴
18.1	15.60	54.1 ⁶⁹	35.16 ⁶	51.7 ³	51.54 ²⁵	68.3 ²⁰	29.02 ⁷	52.9 ⁶
28.1	15.05	51.6 ⁵⁵	35.12 ⁴	51.5 ²	51.34 ²⁰	66.0 ²³	28.96 ⁶	52.0 ⁹
	40	27	2	0	14	25	3	11
pt. 7.1	14.65	48.9	35.10	51.5	51.20	63.5	28.93	50.9
17.0	14.44	46.0 ²¹	35.11 ¹	51.6 ¹	51.13 ⁷	60.9 ²⁶	28.92 ¹	49.5 ¹⁴
27.0	14.43	43.0 ¹	35.15 ⁴	52.0 ⁴	51.15 ²	58.2 ²⁷	28.95 ³	47.9 ¹⁶
t. 7.0	14.63	40.0 ²⁰	35.24 ⁹	52.6 ⁶	51.25 ¹⁰	55.6 ²⁶	29.02 ⁷	46.0 ¹⁹
16.9	15.05	37.2 ⁴²	35.36 ¹²	53.5 ⁹	51.45 ²⁰	53.2 ²⁴	29.12 ¹⁰	43.9 ²¹
	63	25	16	12	29	21	16	23
26.9	15.68	34.7	35.52	54.7	51.74	51.1	29.28	41.6
iv. 5.9	16.50	32.6 ⁸²	35.73 ²¹	56.1 ¹⁴	52.12 ³⁸	49.4 ¹⁷	29.48 ²⁰	39.2 ²⁴
15.9	17.48	30.9 ⁹⁸	35.97 ²⁴	57.7 ¹⁶	52.57 ⁴⁵	48.2 ¹²	29.72 ²⁴	36.6 ²⁶
25.8	18.60 ¹¹²	29.8 ¹¹	36.25 ²⁸	59.6 ¹⁹	53.09 ⁵²	47.5 ⁷	30.00 ²⁸	34.0 ²⁶
xc. 5.8	19.82 ¹²²	29.3 ⁵	36.56 ³¹	61.6 ²⁰	53.66 ⁵⁷	47.4 ¹	30.31 ³¹	31.5 ²⁵
	128	1	33	22	60	4	34	25
15.8	21.10	29.4	36.89	63.8	54.26	47.8	30.65	29.0
25.8	22.40 ¹³⁰	30.2 ⁸	37.23 ³⁴	66.0 ²²	54.88 ⁶²	48.9 ¹¹	31.00 ³⁵	26.8 ²²
35.7	23.68 ¹²⁸	31.6 ¹⁴	37.57 ³⁴	68.2 ²²	55.49 ⁶¹	50.5 ¹⁶	31.35 ³⁵	24.7 ²¹
δ , Tan δ	5.168	-5.070	1.000	-0.003	2.175	-1.932	1.074	+0.391
m Place	19°.926	24''.94	33°.429	40''.25	51°.556	41''.44	27°.180	60''.10
α , D_{α}	+0.01	-0.34	0.00	0.00	0.00	-0.13	0.00	+0.03
δ , D_{δ}	-0.4	-0.1	-0.4	-0.1	-0.4	-0.1	-0.4	-0.1

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	δ Corvi. Mag. 3.1			γ Crucis. Mag. 1.6			ϵ Canum Venat. Mag. 4.3			κ Draconis. Mag. 3.9		
	Right Ascension.		Declination S.	Right Ascension.		Declination S.	Right Ascension.		Declination N.	Right Ascension.		Declination N.
	h m	s	'	h m	s	'	h m	s	'	h m	s	'
	12 25		-16 2	12 26		-56 38	12 29		+41 48	12 29		+70 14
Jan. 0.7	28.36		32.5	26.39		2.1	43.64		49.8	53.71		59.7
10.7	28.70	34	34.8	26.92	53	4.1	44.05	41	48.4	54.47	76	59.0
20.7	29.03	33	37.1	27.41	49	6.6	44.45	40	47.4	55.21	74	58.9
30.7	29.34	31	39.4	27.86	45	9.4	44.82	37	47.0	55.91	70	59.4
Feb. 9.6	29.61	27	41.6	28.26	40	12.5	45.15	33	47.2	56.53	62	60.6
		23			34			28			54	
19.6	29.84		43.7	28.60		15.7	45.43		47.8	57.07		62.3
Mar. 1.6	30.03	19	45.6	28.88	28	19.1	45.66	23	48.9	57.50	43	64.5
11.6	30.18	15	47.3	29.09	21	22.6	45.84	18	50.4	57.81	31	67.0
21.5	30.29	11	48.8	29.24	15	26.0	45.97	13	52.2	58.00	19	69.8
31.5	30.37	8	50.1	29.33	9	29.3	46.04	7	54.3	58.07	7	72.8
		4			4			2			4	
Apr. 10.5	30.41		51.1	29.37		32.4	46.06		56.5	58.03		75.7
20.4	30.42	1	51.9	29.35	2	35.3	46.03	3	58.6	57.87	16	78.6
30.4	30.40	2	52.5	29.28	7	37.9	45.96	7	60.7	57.61	26	81.2
May 10.4	30.36	4	52.9	29.17	11	40.2	45.86	10	62.7	57.27	34	83.5
20.4	30.31	5	53.1	29.02	15	42.1	45.74	12	64.5	56.87	40	85.5
		8			19			14			46	
30.3	30.23	8	53.1	28.83		43.6	45.60		66.0	56.41		87.0
June 9.3	30.15		52.9	28.62	21	44.7	45.44	16	67.2	55.92	49	88.0
19.3	30.06	9	52.5	28.39	23	45.4	45.27	17	68.0	55.40	52	88.5
29.3	29.96	10	52.1	28.14	25	45.5	45.10	17	68.5	54.88	52	88.5
July 9.2	29.86	10	51.4	27.88	26	45.3	44.93	17	68.5	54.36	52	87.9
		11			25			17			50	
19.2	29.75		50.7	27.63		44.6	44.76		68.2	53.86		86.9
29.2	29.66	9	49.8	27.38	25	43.4	44.60	16	67.5	53.40	46	85.3
Aug. 8.1	29.57	9	48.9	27.15	23	41.9	44.46	14	66.4	52.98	42	83.2
18.1	29.49	8	48.0	26.95	20	40.0	44.34	12	64.9	52.61	37	80.8
28.1	29.44	5	47.1	26.79	16	37.8	44.24	10	63.1	52.31	30	77.9
		3			11			7			23	
Sept. 7.1	29.41		46.3	26.68		35.5	44.17		61.0	52.08		74.7
17.0	29.40	1	45.5	26.63	5	33.0	44.14	3	58.6	51.93	15	71.3
27.0	29.44	4	45.0	26.65	2	30.5	44.15	1	55.9	51.87	6	67.7
Oct. 7.0	29.51	7	44.6	26.74	9	28.1	44.21	6	53.0	51.91	4	63.9
17.0	29.63	12	44.5	26.90	16	25.9	44.31	10	49.9	52.05	14	60.1
		16			25			16			24	
26.9	29.79		44.7	27.15		24.0	44.47		46.8	52.29		56.3
Nov. 5.9	30.00	21	45.3	27.47	32	22.5	44.68	21	43.6	52.64	35	52.6
15.9	30.25	25	46.2	27.86	30	21.5	44.94	26	40.5	53.09	45	49.1
25.8	30.54	29	47.4	28.30	44	21.0	45.25	31	37.4	53.63	54	46.0
Dec. 5.8	30.86	32	48.9	28.79	49	21.0	45.60	35	34.6	54.26	63	43.2
		34			52			38			69	
15.8	31.20		50.7	29.31		21.6	45.98		32.0	54.95		40.9
25.8	31.55	35	52.7	29.85	54	22.8	46.38	40	29.8	55.68	73	39.2
35.7	31.90	35	54.9	30.38	53	24.5	46.79	41	28.1	56.44	76	38.0
Sec δ , Tan δ	1.040		-0.288	1.818		-1.519	1.342		+0.894	2.959		+2.785
Mean Place	27°.862		32''.34	26°.420		13''.90	42°.626		69''.01	51°.770		83''.98
$D'\psi n$, $D_{\omega} \alpha$	0.00		-0.02	0.00		-0.10	0.00		+0.06	-0.01		+0.18
$D'\psi \delta$, $D_{\omega} \delta$	-0.4		-0.1	-0.4		-0.1	-0.4		-0.1	-0.4		-0.1

FOR THE UPPER TRANSIT AT WASHINGTON.

an Solar Date.	β Corvi. Mag. 2.8		24 Comæ seq. Mag. 5.2		α Muscæ. Mag. 2.9		χ Virginis. Mag. 4.8	
	Right Ascension.	Declination S.	Right Ascension.	Declination N.	Right Ascension.	Declination S.	Right Ascension.	Declination S.
	h m	s	h m	s	h m	s	h m	s
	12 29	— 22 55	12 30	+ 18 50	12 32	— 68 39	12 34	— 7 31
	s	"	s	"	s	"	s	"
1. 0.7	55.52	34.4	52.76	28.7	5.47	48.5	51.96	44.1
10.7	55.88	36.7	53.11	26.8	6.20	50.3	52.30	46.3
20.7	56.22	39.1	53.44	25.2	6.90	52.5	52.63	48.5
30.7	56.54	41.5	53.76	23.9	7.54	55.2	52.93	50.5
b. 9.6	56.82	43.9	54.04	23.1	8.10	58.3	53.20	52.4
19.6	57.06	46.3	54.28	22.6	8.59	61.6	53.44	54.1
r. 1.6	57.27	48.5	54.48	22.6	8.99	65.2	53.64	55.6
11.6	57.43	50.6	54.64	22.9	9.30	68.8	53.79	56.8
21.5	57.54	52.4	54.75	23.5	9.51	72.5	53.91	57.8
31.5	57.62	54.1	54.83	24.3	9.63	76.1	54.00	58.6
r. 10.5	57.67	55.5	54.86	25.3	9.67	79.6	54.04	59.1
20.4	57.68	56.7	54.87	26.5	9.62	82.9	54.06	59.4
30.4	57.67	57.7	54.84	27.7	9.50	86.0	54.05	59.5
y 10.4	57.63	58.4	54.79	29.0	9.30	88.8	54.03	59.4
20.4	57.58	58.9	54.73	30.2	9.04	91.2	53.98	59.3
30.3	57.50	59.2	54.64	31.3	8.73	93.2	53.91	59.0
ae 9.3	57.41	59.2	54.55	32.3	8.36	94.7	53.84	58.6
19.3	57.31	59.0	54.45	33.1	7.96	95.7	53.75	58.1
29.3	57.21	58.6	54.34	33.7	7.53	96.2	53.66	57.5
ly 9.2	57.10	58.1	54.23	34.1	7.09	96.2	53.57	56.9
19.2	56.99	57.3	54.13	34.3	6.64	95.7	53.47	56.3
29.2	56.88	56.3	54.03	34.3	6.21	94.7	53.38	55.6
g. 8.1	56.78	55.3	53.94	34.1	5.81	93.2	53.29	55.0
18.1	56.70	54.1	53.86	33.6	5.46	91.3	53.21	54.4
28.1	56.63	53.0	53.80	32.8	5.17	89.1	53.15	53.9
ot. 7.1	56.59	51.8	53.76	31.8	4.95	86.5	53.12	53.4
17.0	56.58	50.7	53.75	30.6	4.82	83.8	53.11	53.2
27.0	56.61	49.7	53.77	29.1	4.80	81.0	53.13	53.1
t. 7.0	56.68	49.0	53.83	27.4	4.90	78.2	53.20	53.3
17.0	56.80	48.5	53.94	25.4	5.10	75.6	53.30	53.7
26.9	56.97	48.3	54.08	23.2	5.43	73.2	53.45	54.4
v. 5.9	57.18	48.4	54.27	20.9	5.86	71.2	53.64	55.3
15.9	57.44	48.9	54.51	18.5	6.39	69.6	53.88	56.6
25.8	57.73	49.8	54.78	16.0	7.01	68.6	54.15	58.1
c. 5.8	58.06	51.1	55.09	13.5	7.70	68.2	54.45	59.9
15.8	58.41	52.7	55.42	11.0	8.43	68.3	54.78	61.9
25.8	58.77	54.5	55.77	8.7	9.18	69.1	55.12	64.0
35.7	59.13	56.7	56.12	6.6	9.93	70.5	55.47	66.2
i, Tan δ	1.086	— 0.423	1.057	+ 0.341	2.749	— 2.561	1.009	— 0.132
i Place	55°.114	36''.53	52°.010	41''.21	5°.988	62''.42	51°.448	40''.65
i, $D_{\alpha} \alpha$	0.00	— 0.03	0.00	+ 0.02	+ 0.01	— 0.17	0.00	— 0.01
i, $D_{\alpha} \delta$	— 0.4	— 0.1	— 0.4	— 0.1	— 0.4	— 0.1	— 0.4	— 0.2

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	γ Centauri. Mag. 2.4		γ Virginis (mean). Mag. 2.9		ρ Virginis. Mag. 5.0		76 Ursæ Majoris. Mag. 5.9	
	Right Ascension.	Declination S.	Right Ascension.	Declination S.	Right Ascension.	Declination N.	Right Ascension.	Declination N.
	h m 12 36	° ' " -48 29	h m 12 37	° ' " - 0 59	h m 12 37	° ' " +10 41	h m 12 37	° ' " +63 10
Jan. 0.7	49.42 ^s	25.9 ["]	21.76 ^s	5.9 ["]	35.61 ^s	63.7 ["]	52.81 ^s	22.8 ["]
10.7	49.87 ⁴⁵	27.9 ²⁰	22.09 ³³	8.1 ²²	35.95 ³⁴	61.6 ²¹	53.41 ⁶⁰	21.8 ¹⁰
20.7	50.31 ⁴⁴	30.3 ²⁴	22.42 ³³	10.1 ²⁰	36.28 ³³	59.8 ¹⁸	53.99 ⁵⁸	21.4 ⁴
30.7	50.71 ⁴⁰	33.0 ²⁷	22.72 ³⁰	12.0 ¹⁹	36.59 ³¹	58.3 ¹⁵	54.54 ⁵⁵	21.6 ²
Feb. 9.6	51.07 ³⁶	35.9 ²⁹	22.99 ²⁷	13.7 ¹⁷	36.87 ²⁸	57.0 ¹³	55.04 ⁵⁰	22.5 ⁹
	31	30	24	14	24	8	44	14
19.6	51.38 ²⁶	38.9 ³¹	23.23 ²⁰	15.1 ¹¹	37.11 ²⁰	56.2 ⁵	55.48 ³⁵	23.9 ¹⁰
Mar. 1.6	51.64 ²¹	42.0 ³²	23.43 ¹⁶	16.2 ⁹	37.31 ¹⁶	55.7 ²	55.83 ²⁷	25.8 ¹³
11.6	51.85 ¹⁵	45.2 ³¹	23.59 ¹²	17.1 ⁶	37.47 ¹²	55.5 ¹	56.10 ¹⁷	28.1 ²⁶
21.5	52.00 ¹⁰	48.3 ²⁹	23.71 ⁸	17.7 ³	37.59 ⁸	55.6 ⁴	56.27 ⁹	30.7 ²⁸
31.5	52.10 ⁶	51.2 ²⁸	23.79 ⁵	18.0 ¹	37.67 ⁵	56.0 ⁵	56.36 ⁰	33.5 ²⁸
Apr. 10.5	52.16 ¹	54.0 ²⁵	23.84 ²	18.1 ¹	37.72 ²	56.5 ⁸	56.36 ⁹	36.3 ²⁸
20.4	52.17 ³	56.5 ²³	23.86 ¹	18.0 ²	37.74 ²	57.3 ⁹	56.27 ¹⁵	39.1 ²⁶
30.4	52.14 ⁷	58.8 ²⁰	23.85 ³	17.8 ⁴	37.72 ³	58.2 ⁹	56.12 ²¹	41.7 ²⁴
May 10.4	52.07 ¹⁰	60.8 ¹⁷	23.82 ⁵	17.4 ⁵	37.69 ⁵	59.1 ⁹	55.91 ²⁷	44.1 ²¹
20.4	51.97 ¹²	62.5 ¹³	23.77 ⁶	16.9 ⁵	37.64 ⁷	60.0 ⁹	55.64 ³¹	46.2 ¹⁶
30.3	51.85 ¹⁵	63.8 ⁹	23.71 ⁸	16.4 ⁶	37.57 ⁹	60.9 ⁹	55.33 ³⁴	47.8 ¹²
June 9.3	51.70 ¹⁷	64.7 ⁵	23.63 ⁸	15.8 ⁶	37.48 ⁹	61.8 ⁹	54.99 ³⁵	49.0 ⁷
19.3	51.53 ¹⁹	65.2 ¹	23.55 ¹⁰	15.2 ⁶	37.39 ⁹	62.5 ⁷	54.64 ³⁶	49.7 ²
29.3	51.34 ²⁰	65.3 ³	23.46 ¹⁰	14.6 ⁶	37.30 ¹⁰	63.2 ⁵	54.27 ³⁵	49.9 ⁸
July 9.2	51.15 ¹⁹	65.0 ⁷	23.36 ¹⁰	14.0 ⁶	37.20 ¹⁰	63.7 ⁴	53.91 ³⁵	49.6 ⁸
19.2	50.95 ¹⁹	64.3 ¹⁰	23.26 ⁹	13.4 ⁵	37.10 ¹⁰	64.1 ²	53.56 ³³	48.8 ¹³
29.2	50.76 ¹⁸	63.3 ¹⁵	23.17 ⁸	12.9 ⁴	37.00 ¹⁰	64.3 ¹	53.23 ³⁰	47.5 ¹⁷
Aug. 8.1	50.58 ¹⁶	61.8 ¹⁷	23.08 ⁸	12.5 ³	36.91 ⁷	64.4 ³	52.93 ²⁷	45.8 ²²
18.1	50.42 ¹³	60.1 ¹⁹	23.00 ⁶	12.2 ³	36.84 ⁷	64.2 ³	52.66 ²³	43.6 ²⁶
28.1	50.29 ⁹	58.2 ²¹	22.94 ⁴	11.9 ⁰	36.77 ⁴	63.9 ⁵	52.43 ¹⁷	41.0 ²⁹
Sept. 7.1	50.20 ⁵	56.1 ²²	22.90 ¹	11.9 ¹	36.73 ¹	63.4 ⁸	52.26 ¹¹	38.1 ³²
17.0	50.15 ¹	53.9 ²²	22.89 ²	12.0 ³	36.72 ²	62.6 ¹⁰	52.15 ⁵	34.9 ³⁵
27.0	50.16 ⁷	51.7 ²⁰	22.91 ⁶	12.3 ⁵	36.74 ⁶	61.6 ¹³	52.10 ³	31.4 ³⁶
Oct. 7.0	50.23 ¹³	49.7 ¹⁶	22.97 ¹⁰	12.8 ⁸	36.80 ⁹	60.3 ¹⁷	52.13 ¹⁸	27.8 ³⁷
17.0	50.36 ²⁰	47.8 ¹⁶	23.07 ¹⁴	13.6 ¹¹	36.89 ¹⁴	58.8 ²³	52.23 ¹⁸	24.1 ³⁷
26.9	50.56 ²⁷	46.2 ¹³	23.21 ¹⁹	14.7 ¹³	37.03 ¹⁹	57.1 ²⁰	52.41 ²⁷	20.4 ³⁷
Nov. 5.9	50.83 ³²	44.9 ⁷	23.40 ²³	16.0 ¹⁶	37.22 ²³	55.1 ²¹	52.68 ³⁵	16.7 ³⁵
15.9	51.15 ³⁸	44.2 ³	23.63 ²⁷	17.6 ¹⁸	37.45 ²⁶	53.0 ²²	53.03 ⁴²	13.2 ³⁹
25.8	51.53 ⁴⁴	43.9 ²	23.90 ³⁰	19.4 ²⁰	37.71 ³⁰	50.8 ²⁴	53.45 ⁵⁴	10.0 ²⁹
Dec. 5.8	51.95 ⁴²	44.1 ⁷	24.20 ³²	21.4 ²¹	38.01 ³²	48.4 ²³	53.93 ⁵⁴	7.1 ²⁵
15.8	52.39 ⁴⁶	44.8 ¹³	24.52 ³⁴	23.5 ²²	38.33 ³⁴	46.1 ²³	54.47 ⁵⁷	4.6 ²⁰
25.8	52.85 ⁴⁷	46.1 ¹⁷	24.86 ³³	25.7 ²²	38.67 ³⁵	43.8 ²²	55.04 ⁶⁰	2.6 ¹⁴
35.7	53.32 ⁴⁷	47.8 ¹⁷	25.19 ³³	27.9 ²²	39.02 ³⁵	41.6 ²²	55.64 ⁶⁰	1.2 ¹⁴
Sec δ , Tan δ	1.509	-1.131	1.000	-0.017	1.018	+0.189	2.216	+1.077
Mean Place	49° 36' 2	35° 47'	21° 21' 0	0° 07'	34° 974	73° 65'	51° 390	46° 47'
D ψ α , D ω α	0.00	-0.07	0.00	0.00	0.00	+0.01	-0.01	+0.13
D ψ δ , D ω δ	-0.4	-0.2	-0.4	-0.2	-0.4	-0.2	-0.4	-0.2

(Eph 15)

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	β Crucis. Mag. 1.5		β Comae. Mag. 5.1		32 H. Camelop. seq. Mag. 5.3		γ Centauri. Mag. 4.3	
	Right Ascension.	Declination S.	Right Ascension.	Declination N.	Right Ascension.	Declination N.	Right Ascension.	Declination S.
	h m 12 42	° ' " -59 13	h m 12 47	° ' " +27 59	h m 12 48	° ' " +83 51	h m 12 48	° ' " -39 42
Jan. 0.8	44.44 ⁵⁶	15.8 ¹⁸	34.27 ³⁷	54.9 ¹⁹	33.41 ²¹⁴	64.1 ⁷	43.55 ⁴¹	53.7 ²⁰
10.7	45.00 ⁵³	17.6 ²²	34.64 ³⁵	53.0 ¹⁴	35.55 ²¹²	63.4 ¹	43.96 ⁴⁰	55.7 ²³
20.7	45.53 ⁵⁰	19.8 ²⁶	34.99 ³⁴	51.6 ¹⁰	37.67 ²⁰³	63.5 ⁶	44.36 ³⁷	58.0 ²⁵
30.7	46.03 ⁴⁵	22.4 ³⁰	35.33 ³⁰	50.6 ⁶	39.70 ¹⁸⁶	64.1 ¹³	44.73 ³³	60.5 ²⁷
Feb. 9.6	46.48 ³⁹	25.4 ³¹	35.63 ²⁷	50.0 ¹	41.56 ¹⁶²	65.4 ¹⁹	45.06 ²⁹	63.2 ²⁷
19.6	46.87 ³³	28.5 ³⁴	35.90 ²³	49.9 ⁴	43.18 ¹³³	67.3 ²³	45.35 ²⁶	65.9 ²⁸
Mar. 1.6	47.20 ²⁶	31.9 ³⁴	36.13 ¹⁸	50.3 ⁷	44.51 ⁹⁸	69.6 ²⁷	45.61 ²⁰	68.7 ²⁸
11.6	47.46 ¹⁹	35.3 ³⁴	36.31 ¹³	51.0 ¹¹	45.49 ⁶²	72.3 ²⁹	45.81 ¹⁵	71.5 ²⁷
21.5	47.65 ¹³	38.7 ³³	36.44 ⁹	52.1 ¹⁴	46.11 ²³	75.2 ³¹	45.96 ¹²	74.2 ²⁵
31.5	47.78 ⁶	42.0 ³²	36.53 ⁵	53.5 ¹⁵	46.34 ¹⁵	78.3 ³¹	46.08 ⁷	76.7 ²⁴
Apr. 10.5	47.84 ¹	45.2 ³⁰	36.58 ²	55.0 ¹⁷	46.19 ⁵²	81.4 ³⁰	46.15 ³	79.1 ²¹
20.5	47.85 ⁴	48.2 ²⁸	36.60 ²	56.7 ¹⁷	45.67 ⁸⁶	84.4 ²⁷	46.18 ⁰	81.2 ¹⁹
30.4	47.81 ¹⁰	51.0 ²⁵	36.58 ⁵	58.4 ¹⁶	44.81 ¹¹⁶	87.1 ²⁴	46.18 ³	83.1 ¹⁶
May 10.4	47.71 ¹⁴	53.5 ²¹	36.53 ⁷	60.0 ¹⁶	43.65 ¹⁴²	89.5 ²¹	46.15 ⁶	84.7 ¹⁰
20.4	47.57 ¹⁸	55.6 ¹⁸	36.46 ⁹	61.6 ¹⁴	42.23 ¹⁶²	91.6 ¹⁵	46.09 ⁹	86.1 ¹⁰
30.3	47.39 ²²	57.4 ¹³	36.37 ¹¹	63.0 ¹²	40.61 ¹⁷⁷	93.1 ¹¹	46.00 ¹⁰	87.1 ⁷
June 9.3	47.17 ²⁴	58.7 ⁹	36.26 ¹¹	64.2 ¹⁰	38.84 ¹⁸⁸	94.2 ⁵	45.90 ¹³	87.8 ³
19.3	46.93 ²⁸	59.6 ⁴	36.15 ¹²	65.2 ⁷	36.96 ¹⁹³	94.7 ⁶	45.77 ¹⁴	88.1 ¹
29.3	46.66 ²⁹	60.0 ⁶	36.03 ¹³	65.9 ¹	35.03 ¹⁸⁸	94.6 ¹²	45.63 ¹⁵	88.2 ⁴
July 9.2	46.38 ²⁸	60.0 ⁶	35.90 ¹³	66.3 ⁴	33.11 ¹⁸⁸	94.0 ¹²	45.48 ¹⁵	87.8 ⁶
19.2	46.09 ²⁸	59.4 ⁹	35.77 ¹³	66.4 ²	31.23 ¹⁷⁹	92.8 ¹⁷	45.33 ¹⁶	87.2 ¹⁰
29.2	45.81 ²⁶	58.5 ¹⁴	35.64 ¹²	66.2 ⁵	29.44 ¹⁶⁵	91.1 ²¹	45.17 ¹³	86.2 ¹²
Aug. 8.2	45.55 ²⁴	57.1 ¹⁸	35.52 ¹⁰	65.7 ⁸	27.79 ¹⁴⁹	89.0 ²⁶	45.02 ¹⁵	85.0 ¹⁴
18.1	45.31 ²⁰	55.3 ²¹	35.42 ⁹	64.9 ¹¹	26.30 ¹²⁹	86.4 ³⁰	44.89 ¹¹	83.6 ¹⁷
28.1	45.11 ¹⁵	53.2 ²³	35.33 ⁶	63.8 ¹⁴	25.01 ¹⁰⁶	83.4 ³⁴	44.78 ⁸	81.9 ¹⁸
Sept. 7.1	44.96 ⁹	50.9 ²⁵	35.27 ³	62.4 ¹⁷	23.95 ⁸⁰	80.0 ³⁵	44.70 ⁴	80.1 ¹⁸
17.0	44.87 ¹	48.4 ²⁵	35.24 ⁰	60.7 ²⁰	23.15 ⁵²	76.5 ³⁸	44.66 ⁰	78.3 ¹⁸
27.0	44.86 ⁶	45.9 ²⁵	35.24 ⁴	58.7 ²²	22.63 ²³	72.7 ³⁹	44.66 ⁵	76.5 ¹⁶
Oct. 7.0	44.92 ¹⁵	43.4 ²³	35.28 ⁸	56.5 ²⁴	22.40 ⁹	68.8 ⁴¹	44.71 ¹¹	74.9 ¹⁵
17.0	45.07 ²³	41.1 ²¹	35.36 ¹³	54.1 ²⁶	22.49 ⁴¹	64.9 ³⁸	44.82 ¹⁷	73.4 ¹²
26.9	45.30 ³¹	39.0 ¹⁸	35.49 ¹⁸	51.5 ²⁸	22.90 ⁷³	61.1 ³⁸	44.99 ²²	72.2 ⁹
Nov. 5.9	45.61 ³⁹	37.2 ¹³	35.67 ²²	48.7 ²⁸	23.63 ¹⁰⁴	57.3 ³⁵	45.21 ²⁸	71.3 ⁴
15.9	46.00 ⁴⁶	35.9 ⁸	35.89 ²⁷	45.9 ²⁸	24.67 ¹³³	53.8 ³¹	45.49 ³³	70.9 ¹
25.9	46.46 ⁵⁵	35.1 ³	36.16 ³¹	43.1 ²⁶	26.00 ¹⁸²	50.7 ²²	45.82 ⁴⁰	70.8 ⁵
Dec. 5.8	46.97 ⁵⁵	34.9 ³	36.47 ³³	40.3 ²¹	27.60 ²⁰⁹	47.9 ¹¹	46.18 ⁴²	71.3 ⁹
15.8	47.52 ⁵⁶	35.2 ⁹	36.80 ³⁵	37.7 ²⁴	29.42 ¹⁹⁹	45.7 ¹⁷	46.58 ⁴¹	72.2 ¹⁴
25.8	48.08 ⁵⁷	36.1 ¹⁴	37.15 ³⁷	35.3 ²¹	31.41 ²⁰⁹	44.0 ¹¹	46.99 ⁴²	73.6 ¹⁷
35.7	48.65 ⁵⁷	37.5 ¹⁴	37.52 ³⁷	33.2 ²¹	33.50 ²⁰⁹	42.9 ¹¹	47.41 ⁴²	75.3 ¹⁷
Sec δ , Tan δ	1.955	-1.679	1.133	+0.532	9.364	+9.310	1.300	-0.831
Mean Place	44°.680	27'°.68	33°.559	70'°.80	29°.536	89'°.63	43°.435	60'°.51
D' α , D α	+0.01	-0.11	0.00	+0.03	-0.05	+0.61	0.00	-0.05
D' δ , D δ	-0.4	-0.2	-0.4	-0.2	-0.4	-0.2	-0.4	-0.2

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	ϵ Ursæ Majoris. (Alioth.) Mag. 1.7		δ Virginis. Mag. 3.7		α Can. Ven. seq. Mag. 2.9		δ Muscæ. Mag. 3.6	
	Right Ascension.	Declination N.	Right Ascension.	Declination N.	Right Ascension.	Declination N.	Right Ascension.	Declination S.
	h m 12 50	° ' + 56 24	h m 12 51	° ' + 3 51	h m 12 52	° ' + 38 45	h m 12 56	° ' - 71 5
	s	"	s	"	s	"	s	"
Jan. 0.8	18.69	52.7	19.77	25.1	4.02	78.9	23.09	12.8
10.7	19.20 ⁵¹	51.4 ¹³	20.11 ³⁴	22.9 ²²	4.41 ³⁹	77.2 ¹⁷	23.93 ⁸⁴	14.1 ¹³
20.7	19.70 ⁵⁰	50.6 ⁸	20.44 ³³	20.9 ²⁰	4.80 ³⁹	76.0 ¹²	24.73 ⁸⁰	15.9 ¹⁸
30.7	20.18 ⁴⁸	50.5 ¹	20.75 ³¹	19.2 ¹⁷	5.16 ³⁶	75.3 ⁷	25.48 ⁷⁵	18.3 ²⁴
Feb. 9.6	20.61 ⁴³	51.0 ⁵	21.03 ²⁸	17.7 ¹⁵	5.50 ³⁴	75.1 ²	26.17 ⁶⁹	21.1 ²⁸
	38	11	24	12	30	4	60	31
Mar. 19.6	20.99	52.1	21.27	16.5	5.80	75.5	26.77	24.2
1.6	21.31 ³²	53.7 ¹⁶	21.48 ²¹	15.6 ⁹	6.05 ²⁵	76.3 ⁸	27.29 ⁵²	27.6 ³⁴
11.6	21.56 ²⁵	55.7 ²⁰	21.66 ¹⁸	15.0 ⁶	6.25 ²⁰	77.6 ¹³	27.71 ⁴²	31.1 ³⁵
21.5	21.74 ¹⁸	58.0 ²³	21.79 ¹³	14.7 ³	6.39 ¹⁴	79.2 ¹⁶	28.03 ³²	34.7 ³⁶
31.5	21.84 ¹⁰	60.6 ²⁶	21.89 ¹⁰	14.7 ⁰	6.49 ¹⁰	81.1 ¹⁹	28.24 ²¹	38.4 ³⁷
	4	27	6	2	5	20	12	36
Apr. 10.5	21.88	63.3	21.95	14.9	6.54	83.1	28.36	42.0
20.5	21.85 ³	66.0 ²⁷	21.98 ³	15.2 ³	6.55 ¹	85.3 ²²	28.38 ²	45.4 ³⁴
30.4	21.76 ⁹	68.6 ²⁶	21.98 ⁰	15.8 ⁶	6.52 ³	87.4 ²¹	28.32 ⁶	48.6 ³²
May 10.4	21.62 ¹⁴	71.0 ²⁴	21.96 ²	16.4 ⁶	6.45 ⁷	89.4 ²⁰	28.16 ¹⁶	51.6 ³⁰
20.4	21.43 ¹⁹	73.1 ²¹	21.92 ⁴	17.1 ⁷	6.35 ¹⁰	91.3 ¹⁹	27.92 ²⁴	54.3 ²⁷
	22	18	6	7	11	17	31	22
June 30.3	21.21	74.9	21.86	17.8	6.24	93.0	27.61	56.5
9.3	20.97 ²⁴	76.3 ¹⁴	21.79 ⁷	18.6 ⁸	6.10 ¹⁴	94.3 ¹³	27.24 ³⁷	58.3 ¹⁸
19.3	20.70 ²⁷	77.2 ⁹	21.71 ⁸	19.3 ⁷	5.95 ¹⁵	95.4 ¹¹	26.82 ⁴²	59.7 ¹⁴
29.3	20.43 ²⁷	77.7 ⁵	21.62 ⁹	19.9 ⁶	5.79 ¹⁶	96.1 ⁷	26.35 ⁴⁷	60.6 ⁹
July 9.2	20.15 ²⁸	77.7 ⁰	21.52 ¹⁰	20.5 ⁶	5.63 ¹⁶	96.4 ³	25.85 ⁵⁰	60.9 ³
	27	5	10	5	17	1	51	1
19.2	19.88	77.2	21.42	21.0	5.46	96.3	25.34	60.8
29.2	19.62 ²⁶	76.2 ¹⁰	21.32 ¹⁰	21.4 ⁴	5.31 ¹⁵	95.8 ⁵	24.83 ⁵¹	60.1 ⁷
Aug. 8.2	19.37 ²⁵	74.8 ¹⁴	21.22 ¹⁰	21.7 ³	5.16 ¹⁵	95.0 ⁸	24.35 ⁴⁸	58.9 ¹²
18.1	19.15 ²²	73.0 ¹⁸	21.14 ⁸	21.9 ²	5.02 ¹⁴	93.8 ¹²	23.90 ⁴⁵	57.2 ¹⁷
28.1	18.96 ¹⁹	70.7 ²³	21.07 ⁷	21.9 ⁰	4.91 ¹¹	92.3 ¹⁵	23.52 ³⁸	55.2 ²⁰
	15	26	5	2	9	19	30	24
Sept. 7.1	18.81	68.1	21.02	21.7	4.82	90.4	23.22	52.8
17.0	18.71 ¹⁰	65.2 ²⁹	20.99 ³	21.3 ⁴	4.77 ⁵	88.2 ²²	23.01 ²¹	50.1 ²⁷
27.0	18.66 ⁵	62.0 ³²	21.00 ¹	20.7 ⁶	4.75 ²	85.7 ²⁵	22.92 ⁹	47.3 ²⁸
Oct. 7.0	18.67 ¹	58.6 ³⁴	21.04 ⁴	19.9 ⁸	4.78 ³	83.0 ²⁷	22.95 ³	44.5 ²⁸
17.0	18.74 ⁷	55.0 ³⁶	21.13 ⁹	18.8 ¹¹	4.85 ⁷	80.0 ³⁰	23.11 ¹⁶	41.8 ²⁷
	15	36	12	13	13	31	29	26
26.9	18.89	51.4	21.25	17.5	4.98	76.9	23.40	39.2
Nov. 5.9	19.10 ²¹	47.8 ³⁶	21.42 ¹⁷	15.9 ¹⁶	5.16 ¹⁸	73.8 ³¹	23.82 ⁴²	36.9 ²³
15.9	19.38 ²⁸	44.3 ³⁵	21.64 ²²	14.1 ¹⁸	5.39 ²³	70.6 ³²	24.36 ⁵⁴	35.0 ¹⁹
25.9	19.72 ³⁴	40.9 ³⁴	21.90 ²⁶	12.1 ²⁰	5.67 ²⁸	67.5 ³¹	25.01 ⁶⁵	33.6 ¹⁴
Dec. 5.8	20.13 ⁴¹	37.9 ³⁰	22.18 ²⁸	10.0 ²¹	5.99 ³²	64.6 ²⁹	25.74 ⁷³	32.8 ⁸
	45	27	32	22	36	28	79	3
15.8	20.58	35.2	22.50	7.8	6.35	61.8	26.53	32.5
25.8	21.06 ⁴⁸	33.0 ²²	22.83 ³³	5.5 ²³	6.73 ³⁸	59.4 ²⁴	27.36 ⁸³	32.9 ⁴
35.7	21.57 ⁵¹	31.3 ¹⁷	23.17 ³⁴	3.3 ²²	7.12 ³⁹	57.4 ²⁰	28.20 ⁸⁴	33.9 ¹⁰
Sec δ , Tan δ	1.808	+1.506	1.002	+0.067	1.283	+0.803	3.086	-2.919
Mean Place	17°.640	75°.62	19°.267	33°.00	3°.235	97°.95	24°.108	26°.22
$D'\psi a$, $D_{\omega} a$	-0.01	+0.10	0.00	0.00	0.00	+0.05	+0.02	-0.19
$D'\psi \delta$, $D_{\omega} \delta$	-0.4	-0.2	-0.4	-0.2	-0.4	-0.2	-0.4	-0.2

(Eph 13)

FOR THE UPPER TRANSIT AT WASHINGTON.

in Solar Date.	ε Virginis. Mag. 3.0		θ Virginis. Mag. 4.4		43 Comæ. Mag. 4.3		20 Canum Venat. Mag. 4.7	
	Right Ascension.	Declination N.	Right Ascension.	Declination S.	Right Ascension.	Declination N.	Right Ascension.	Declination N.
	h m 12 57	° ' " + 11 24	h m 13 5	° ' " - 5 5	h m 13 7	° ' " + 28 17	h m 13 13	° ' " + 41 0
n. 0.8	57.25	46.0	33.18	12.9	55.08	75.2	44.66	51.6
10.7	57.60 ³⁵	43.9 ²¹	33.52 ³⁴	15.0 ²¹	55.44 ³⁶	73.2 ²⁰	45.06 ⁴⁰	49.7 ¹⁹
20.7	57.93 ³³	42.0 ¹⁹	33.86 ³⁴	17.1 ²¹	55.80 ³⁶	71.6 ¹⁶	45.46 ⁴⁰	48.3 ¹⁴
30.7	58.25 ³²	40.5 ¹⁵	34.17 ³¹	19.1 ²⁰	56.14 ³⁴	70.5 ¹¹	45.84 ³⁸	47.5 ⁸
b. 9.7	58.54 ²⁹	39.3 ¹²	34.46 ²⁹	20.9 ¹⁸	56.45 ³¹	69.9 ⁶	46.20 ³⁶	47.2 ³
	58.54 ²⁵	39.3 ⁹	34.46 ²⁶	20.9 ¹⁵	56.45 ²⁸	69.9 ²	46.20 ³²	47.2 ³
19.6	58.79	38.4	34.72	22.4	56.73	69.7	46.52	47.5
ir. 1.6	59.01 ²²	37.9 ⁵	34.95 ²³	23.7 ¹³	56.97 ²⁴	70.0 ³	46.80 ²⁸	48.3 ⁸
11.6	59.19	37.7	35.13 ¹⁸	24.8 ¹¹	57.17 ²⁰	70.8 ⁸	47.02 ²²	49.6 ¹³
21.5	59.33 ¹⁴	37.8 ¹	35.28 ¹⁵	25.6 ⁸	57.33 ¹⁶	71.9 ¹¹	47.20 ¹⁸	51.3 ¹⁷
31.5	59.43 ¹⁰	38.2 ⁴	35.39 ¹¹	26.2 ⁶	57.44 ¹¹	73.2 ¹³	47.32 ¹²	53.2 ¹⁹
	59.43 ⁷	38.2 ⁷	35.39 ⁸	26.2 ³	57.44 ⁷	73.2 ¹⁶	47.32 ⁸	53.2 ²²
ir. 10.5	59.50	38.9	35.47	26.5	57.51	74.8	47.40	55.4
20.5	59.53 ³	39.7 ⁸	35.52 ⁵	26.7 ²	57.54 ³	76.6 ¹⁸	47.43 ³	57.7 ²³
30.4	59.54 ¹	40.7 ¹⁰	35.55 ³	26.6 ¹	57.54 ⁰	78.4 ¹⁸	47.42 ¹	60.0 ²³
ly 10.4	59.52 ²	41.7 ¹⁰	35.54 ¹	26.4 ²	57.51 ³	80.2 ¹⁸	47.37 ⁵	62.2 ²²
20.4	59.48 ⁴	42.7 ¹⁰	35.52 ²	26.1 ³	57.45 ⁶	81.9 ¹⁷	47.28 ⁹	64.3 ²¹
	59.48 ⁶	42.7 ¹⁰	35.52 ⁵	26.1 ⁴	57.45 ⁸	81.9 ¹⁶	47.28 ¹¹	64.3 ¹⁹
30.4	59.42	43.7	35.47	25.7	57.37	83.5	47.17	66.2
ne 9.3	59.34 ⁸	44.7 ¹⁰	35.41 ⁶	25.2 ⁵	57.28 ⁹	84.9 ¹⁴	47.04 ¹³	67.8 ¹⁶
19.3	59.26 ⁸	45.5 ⁸	35.34 ⁷	24.7 ⁵	57.16 ¹²	86.0 ¹¹	46.88 ¹⁶	69.0 ¹²
29.3	59.16 ¹⁰	46.3 ⁸	35.25 ⁹	24.1 ⁶	57.04 ¹²	86.9 ⁹	46.72 ¹⁶	69.9 ⁹
ly 9.2	59.06 ¹¹	46.9 ⁶	35.15 ¹⁰	23.5 ⁶	56.91 ¹³	87.5 ⁶	46.54 ¹⁸	70.4 ⁵
	59.06 ¹¹	46.9 ⁴	35.15 ¹⁰	23.5 ⁶	56.91 ¹⁴	87.5 ²	46.54 ¹⁸	70.4 ¹
19.2	58.95	47.3	35.05	22.9	56.77	87.7	46.36	70.5
29.2	58.85 ¹⁰	47.6 ³	34.95 ¹⁰	22.4 ⁵	56.64 ¹³	87.7 ⁰	46.18 ¹⁸	70.1 ⁴
ig. 8.2	58.75 ¹⁰	47.7 ¹	34.85 ¹⁰	21.8 ⁶	56.51 ¹³	87.3 ⁴	46.01 ¹⁷	69.4 ⁷
18.1	58.65 ¹⁰	47.5 ²	34.76 ⁹	21.4 ⁴	56.38 ¹³	86.6 ⁷	45.85 ¹⁶	68.3 ¹¹
28.1	58.57 ⁸	47.2 ³	34.68 ⁸	21.0 ⁴	56.28 ¹⁰	85.6 ¹⁰	45.71 ¹⁴	66.8 ¹⁵
	58.57 ⁶	47.2 ⁵	34.68 ⁶	21.0 ³	56.28 ⁹	85.6 ¹³	45.71 ¹²	66.8 ¹⁹
pt. 7.1	58.51	46.7	34.62	20.7	56.19	84.3	45.59	64.9
17.1	58.48 ³	45.9 ⁸	34.58 ⁴	20.6 ¹	56.13 ⁶	82.7 ¹⁶	45.50 ⁹	62.7 ²²
27.0	58.48 ⁰	44.9 ¹⁰	34.57 ¹	20.7 ¹	56.11 ²	80.8 ¹⁹	45.46 ⁴	60.2 ²⁵
st. 7.0	58.51 ³	43.6 ¹³	34.61 ⁴	20.9 ²	56.12 ¹	78.6 ²²	45.45 ¹	57.4 ²⁸
17.0	58.59 ⁸	42.1 ¹⁵	34.68 ⁷	21.4 ⁵	56.18 ⁶	76.2 ²⁴	45.49 ⁴	54.4 ³⁰
	58.59 ¹²	42.1 ¹⁸	34.68 ¹²	21.4 ⁸	56.18 ¹⁰	76.2 ²⁶	45.49 ¹⁰	54.4 ³²
26.9	58.71	40.3	34.80	22.2	56.28	73.6	45.59	51.2
dv. 5.9	58.87 ¹⁶	38.3 ²⁰	34.96 ¹⁶	23.3 ¹¹	56.43 ¹⁵	70.9 ²⁷	45.74 ¹⁵	48.0 ³²
15.9	59.08 ²¹	36.2 ²¹	35.17 ²¹	24.6 ¹³	56.63 ²⁰	68.0 ²⁹	45.95 ²¹	44.7 ³³
25.9	59.33 ²⁵	33.9 ²³	35.42 ²⁵	26.1 ¹⁵	56.88 ²⁵	65.2 ²⁸	46.21 ²⁶	41.4 ³³
ec. 5.8	59.62 ²⁹	31.5 ²⁴	35.71 ²⁹	27.9 ¹⁸	57.17 ²⁹	62.3 ²⁶	46.52 ³¹	38.3 ³¹
	59.62 ³¹	31.5 ²⁴	35.71 ³¹	27.9 ²⁰	57.17 ³²	62.3 ²⁶	46.52 ³⁴	38.3 ²⁸
15.8	59.93	29.1	36.02	29.9	57.49	59.7	46.86	35.5
25.8	60.26 ³³	26.8 ²³	36.35 ³³	32.0 ²¹	57.84 ³⁵	57.2 ²⁵	47.24 ³⁸	32.9 ²⁶
35.8	60.60 ³⁴	24.6 ²²	36.69 ³⁴	34.1 ²¹	58.20 ³⁶	55.0 ²²	47.63 ³⁹	30.8 ²¹
δ, Tan δ	1.020	+0.202	1.004	-0.089	1.136	+0.538	1.325	+0.870
Place	56°.741	56''.75	32°.829	7''.72	54°.514	91''.63	44°.057	71''.61
α, D _α α	0.00	+0.01	0.00	-0.01	0.00	+0.03	-0.01	+0.06
β, D _β β	-0.4	-0.2	-0.4	-0.3	-0.4	-0.3	-0.4	-0.3

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	γ Hydræ. Mag. 3.3		ι Centauri. Mag. 2.9		ζ^1 Ursæ Majoris. (Mizar.) Mag. 2.4		α Virginis. (Spica.) Mag. 1.2	
	Right Ascension.	Declination S.	Right Ascension.	Declination S.	Right Ascension.	Declination N.	Right Ascension.	Declination S.
	h m 13 14	° ' —22 43	h m 13 15	° ' —36 15	h m 13 20	° ' +55 21	h m 13 20	° ' —10 43
Jan. 0.8	17.98 ^s	23.4 ["]	48.73 ^s	46.3 ["]	31.05 ^s	45.2 ["]	43.00 ^s	8.1 ["]
10.7	18.35 ³⁷	25.4 ²⁰	49.13 ⁴⁰	48.1 ¹⁸	31.54 ⁴⁹	43.4 ¹⁸	43.35 ³⁵	10.2 ²¹
20.7	18.71 ³⁶	27.5 ²¹	49.53 ⁴⁰	50.2 ²¹	32.03 ⁴⁹	42.3 ¹¹	43.69 ³⁴	12.3 ²¹
30.7	19.04 ³³	29.7 ²²	49.90 ³⁷	52.5 ²³	32.51 ⁴⁸	41.8 ⁵	44.01 ³²	14.3 ²⁰
Feb. 9.7	19.35 ³¹	31.9 ²²	50.25 ³⁵	54.9 ²⁴	32.95 ⁴⁴	42.0 ²	44.31 ³⁰	16.2 ¹⁹
19.6	19.63 ²⁸	34.1 ²²	50.56 ³¹	57.4 ²⁵	33.35 ⁴⁰	42.7 ⁷	44.58 ²⁷	17.9 ¹⁷
Mar. 1.6	19.88 ²⁵	36.2 ²¹	50.83 ²⁷	59.9 ²⁵	33.70 ³⁵	44.0 ¹³	44.82 ²⁴	19.5 ¹⁶
11.6	20.09 ²¹	38.1 ¹⁹	51.05 ²²	62.4 ²⁵	33.99 ²⁹	45.8 ¹⁸	45.02 ²⁰	20.8 ¹³
21.6	20.25 ¹⁶	39.8 ¹⁷	51.24 ¹⁹	64.9 ²⁵	34.21 ²²	48.0 ²²	45.19 ¹⁷	21.9 ¹¹
31.5	20.38 ¹³	41.4 ¹⁶	51.39 ¹⁵	67.2 ²³	34.36 ¹⁵	50.5 ²⁵	45.32 ¹³	22.8 ⁹
Apr. 10.5	20.48 ¹⁰	42.8 ¹⁴	51.49 ¹⁰	69.3 ²¹	34.45 ⁹	53.2 ²⁷	45.42 ¹⁰	23.4 ⁶
20.5	20.55 ⁷	44.0 ¹²	51.56 ⁷	71.2 ¹⁹	34.47 ²	56.0 ²⁸	45.49 ⁷	23.9 ⁵
30.4	20.58 ³	44.9 ⁹	51.60 ⁴	73.0 ¹⁸	34.43 ⁴	58.7 ²⁷	45.52 ³	24.2 ³
May 10.4	20.59 ¹	45.7 ⁸	51.60 ⁰	74.5 ¹⁵	34.33 ¹⁰	61.3 ²⁶	45.53 ¹	24.3 ¹
20.4	20.57 ²	46.3 ⁶	51.57 ³	75.7 ¹²	34.19 ¹⁴	63.7 ²⁴	45.52 ¹	24.2 ¹
30.4	20.53 ⁴	46.7 ⁴	51.52 ⁵	76.7 ¹⁰	34.01 ¹⁸	65.7 ²⁰	45.49 ³	24.0 ²
June 9.3	20.47 ⁶	46.8 ¹	51.44 ⁸	77.5 ⁸	33.79 ²²	67.4 ¹⁷	45.44 ⁵	23.8 ²
19.3	20.39 ⁸	46.8 ⁰	51.34 ¹⁰	77.9 ⁴	33.55 ²⁴	68.7 ¹³	45.37 ⁷	23.4 ⁴
29.3	20.30 ⁹	46.6 ²	51.22 ¹²	78.0 ¹	33.29 ²⁶	69.6 ⁹	45.29 ⁸	22.9 ⁵
July 9.3	20.19 ¹¹	46.2 ⁴	51.09 ¹³	77.8 ²	33.01 ²⁷	70.0 ¹	45.19 ¹⁰	22.4 ⁶
19.2	20.08 ¹²	45.6 ⁷	50.94 ¹⁵	77.4 ⁷	32.74 ²⁸	69.9 ⁶	45.09 ¹¹	21.8 ⁶
29.2	19.96 ¹²	44.9 ⁸	50.79 ¹⁵	76.7 ¹⁰	32.46 ²⁷	69.3 ¹¹	44.98 ¹¹	21.2 ⁶
Aug. 8.2	19.84 ¹¹	44.1 ¹⁰	50.64 ¹⁴	75.7 ¹²	32.19 ²⁵	68.2 ¹⁵	44.87 ¹⁰	20.6 ⁶
18.1	19.73 ¹⁰	43.1 ¹⁰	50.50 ¹²	74.5 ¹⁴	31.94 ²²	66.7 ²⁰	44.77 ⁹	20.0 ⁶
28.1	19.63 ⁸	42.1 ¹⁰	50.38 ¹⁰	73.1 ¹⁵	31.72 ¹⁹	64.7 ²³	44.68 ⁸	19.4 ⁵
Sept. 7.1	19.55 ⁵	41.1 ¹⁰	50.28 ⁷	71.6 ¹⁶	31.53 ¹⁵	62.4 ²⁷	44.60 ⁵	18.9 ⁴
17.1	19.50 ¹	40.1 ⁹	50.21 ⁷	70.0 ¹⁶	31.38 ¹⁰	59.7 ³¹	44.55 ²	18.5 ³
27.0	19.49 ²	39.2 ⁸	50.19 ²	68.4 ¹⁵	31.28 ⁵	56.6 ³³	44.53 ²	18.2 ¹
Oct. 7.0	19.51 ⁷	38.4 ⁶	50.21 ⁷	66.9 ¹³	31.23 ²	53.3 ³⁵	44.55 ⁶	18.1 ²
17.0	19.58 ¹²	37.8 ³	50.28 ¹³	65.6 ¹¹	31.25 ⁸	49.8 ³⁶	44.61 ¹¹	18.3 ⁴
27.0	19.70 ¹⁷	37.5 ⁰	50.41 ¹⁹	64.5 ⁸	31.33 ¹⁵	46.2 ³⁶	44.72 ¹⁵	18.7 ⁷
Nov. 5.9	19.87 ²²	37.5 ³	50.60 ²⁴	63.7 ⁵	31.48 ²³	42.6 ³⁷	44.87 ²⁰	19.4 ⁹
15.9	20.09 ²⁷	37.8 ⁶	50.84 ²⁹	63.2 ⁰	31.71 ³⁵	38.9 ³²	45.07 ²⁵	20.3 ¹³
25.9	20.36 ³⁰	38.4 ¹⁰	51.13 ³⁴	63.2 ³	32.00 ²⁹	35.4 ³⁵	45.32 ²⁸	21.6 ¹⁵
Dec. 5.8	20.66 ³³	39.4 ¹⁴	51.47 ³⁷	63.5 ⁸	32.35 ⁴¹	32.2 ³⁰	45.60 ³¹	23.1 ¹⁷
15.8	20.99 ³⁶	40.8 ¹⁶	51.84 ³⁹	64.3 ¹²	32.76 ⁴⁵	29.2 ²⁵	45.91 ³³	24.8 ¹⁹
25.8	21.35 ³⁶	42.4 ¹⁸	52.23 ⁴⁰	65.5 ¹⁶	33.21 ⁴⁸	26.7 ²¹	46.24 ³⁴	26.7 ²⁰
35.8	21.71 ³⁶	44.2 ¹⁸	52.63 ⁴⁰	67.1 ¹⁶	33.69 ⁴⁸	24.6 ²¹	46.58 ³⁴	28.7 ²⁰
Sec δ , Tan δ	1.084	—0.419	1.240	—0.734	1.759	+1.448	1.018	—0.189
Mean Place	17° 827	24' 10	48° 741	51' 30	30° 405	68' 38	42° 776	4' 50
D ψ α , D ω α	0.00	—0.03	+0.01	—0.05	—0.01	+0.09	0.00	—0.01
D ψ δ , D ω δ	—0.4	—0.3	—0.4	—0.3	—0.4	—0.3	—0.4	—0.3

[Eph 15]

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	Groombridge 2001. Mag. 6.1		70 Virginis. Mag. 5.2		κ Octantis. Mag. 5.6		ζ Virginis. Mag. 3.4	
	Right Ascension.	Declination N.	Right Ascension.	Declination N.	Right Ascension.	Declination S.	Right Ascension.	Declination S.
	h m 13 23	° ' " +72 49	h m 13 24	° ' " +14 13	h m 13 26	° ' " -85 20	h m 13 30	° ' " -0 9
Jan. 0.8	58.68 ⁸²	31.8 ¹⁴	16.72 ³⁴	44.5 ²²	48.86 ³⁰⁵	51.3 ⁵	21.87 ³⁴	49.4 ²¹
10.8	59.50 ⁸³	30.4 ⁷	17.06 ³⁴	42.3 ¹⁹	51.91 ³⁰¹	51.8 ¹²	22.21 ³³	51.5 ²⁰
20.7	60.33 ⁸²	29.7 ⁶	17.40 ³³	40.4 ¹²	54.92 ²⁸⁹	53.0 ²²	22.54 ³²	53.5 ¹⁶
30.7	61.15 ⁷⁸	29.6 ¹²	17.73 ³⁰	38.8 ⁸	57.81 ²⁴⁷	54.7 ²⁷	22.86 ²⁸	55.3 ¹⁴
Feb. 9.7	61.93 ⁷⁰	30.2 ¹²	18.03 ²⁸	37.6 ¹²	60.52 ²⁴⁷	56.9 ²⁷	23.16 ³⁰	56.9 ¹⁴
19.6	62.63 ⁶¹	31.4 ¹⁸	18.31 ²⁴	36.8 ⁵	62.99 ²¹⁷	59.6 ³⁰	23.44 ²⁴	58.3 ¹¹
Mar. 1.6	63.24 ⁴⁹	33.2 ²³	18.55 ²⁰	36.3 ¹⁷	65.16 ¹⁸⁴	62.6 ³⁴	23.68 ²⁰	59.4 ⁸
11.6	63.73 ³⁷	35.5 ²⁶	18.75 ¹⁷	36.2 ³	67.00 ¹⁴⁷	66.0 ³⁶	23.88 ¹⁷	60.2 ⁵
21.6	64.10 ²³	38.1 ²⁹	18.92 ¹²	36.5 ⁶	68.47 ¹⁰⁹	69.6 ³⁷	24.05 ¹⁴	60.7 ²
31.5	64.33 ¹⁰	41.0 ³⁰	19.04 ¹⁰	37.1 ⁸	69.56 ⁷⁰	73.3 ³⁸	24.19 ¹⁰	60.9 ⁰
Apr. 10.5	64.43 ³	44.0 ³¹	19.14 ⁶	37.9 ¹⁰	70.26 ³⁰	77.1 ³⁷	24.29 ⁸	60.9 ²
20.5	64.40 ¹⁶	47.1 ³⁰	19.20 ²	38.9 ¹²	70.56 ¹¹	80.8 ³⁶	24.37 ⁴	60.7 ³
30.5	64.24 ²⁷	50.1 ²⁷	19.22 ⁰	40.1 ¹²	70.45 ⁵⁰	84.4 ³⁵	24.41 ¹	60.4 ⁵
May 10.4	63.97 ⁴⁶	52.8 ²¹	19.22 ⁴	41.3 ¹²	69.95 ¹²²	87.9 ²⁹	24.42 ³	59.9 ⁷
20.4	63.60 ⁵³	55.3 ¹⁶	19.20 ⁷	42.5 ¹¹	69.08 ¹⁵⁵	91.2 ²⁵	24.42 ⁵	59.3 ⁶
30.4	63.14 ⁵⁸	57.4 ¹²	19.16 ⁸	43.7 ¹⁰	67.86 ¹⁸²	94.1 ²¹	24.39 ⁷	58.6 ⁷
June 9.3	62.61 ⁶²	59.0 ⁶	19.09 ¹¹	44.8 ⁸	66.31 ²⁰⁶	96.6 ¹¹	24.34 ⁹	58.0 ⁶
19.3	62.03 ⁶⁴	60.2 ⁵	19.01 ¹¹	45.8 ⁵	64.49 ²²²	98.7 ⁵	24.27 ¹⁰	57.3 ⁶
29.3	61.41 ⁶⁴	60.8 ⁵	18.92 ¹¹	46.6 ⁵	62.43 ²³³	100.3 ¹	24.19 ¹¹	56.6 ⁵
July 9.3	60.77 ⁶³	61.0 ⁹	18.81 ¹¹	47.3 ³	60.21 ²³⁶	101.4 ⁷	24.10 ¹¹	56.0 ⁶
19.2	60.13 ⁶³	60.5 ⁹	18.70 ¹¹	47.8 ³	57.88 ²³⁶	101.9 ¹	24.00 ¹¹	55.4 ⁵
29.2	59.50 ⁶¹	59.6 ¹⁵	18.59 ¹²	48.1 ¹²	55.52 ²³¹	101.8 ¹	23.89 ¹¹	54.9 ⁵
Aug. 8.2	58.89 ⁵⁷	58.1 ¹⁹	18.47 ¹¹	48.2 ²	53.21 ²¹⁸	101.1 ¹²	23.78 ¹¹	54.4 ³
18.2	58.32 ⁵²	56.2 ²⁴	18.36 ¹⁰	48.0 ⁴	51.03 ¹⁹⁷	99.9 ¹⁷	23.67 ⁹	54.1 ²
28.1	57.80 ⁴⁵	53.8 ²⁸	18.26 ⁸	47.6 ⁶	49.06 ¹⁶⁸	98.2 ²¹	23.58 ⁸	53.9 ⁰
Sept. 7.1	57.35 ³⁷	51.0 ³²	18.18 ⁶	47.0 ⁹	47.38 ¹³¹	96.1 ²⁶	23.50 ⁶	53.9 ¹
17.1	56.98 ²⁷	47.8 ³⁴	18.12 ³	46.1 ¹²	46.07 ⁹⁰	93.5 ²⁸	23.44 ³	54.0 ³
27.0	56.71 ¹⁷	44.4 ³⁷	18.09 ⁰	44.9 ¹⁴	45.17 ⁴¹	90.7 ³⁰	23.41 ⁰	54.3 ⁶
Oct. 7.0	56.54 ⁶	40.7 ³⁸	18.09 ⁵	43.5 ¹⁶	44.76 ¹⁰	87.7 ³¹	23.41 ⁵	54.9 ⁸
17.0	56.48 ⁷	36.9 ³⁹	18.14 ⁹	41.9 ¹⁹	44.86 ⁶¹	84.6 ³⁰	23.46 ⁹	55.7 ¹⁰
27.0	56.55 ¹⁹	33.0 ³⁹	18.23 ¹⁴	40.0 ²¹	45.47 ¹¹³	81.6 ²⁸	23.55 ¹⁴	56.7 ¹³
Nov. 5.9	56.74 ³²	29.1 ³⁸	18.37 ¹⁸	37.9 ²³	46.60 ¹⁶²	78.8 ²⁶	23.69 ¹⁸	58.0 ¹⁵
15.9	57.06 ⁴⁴	25.3 ³³	18.55 ²⁷	35.6 ²⁵	48.22 ²⁰⁵	76.2 ²¹	23.87 ²⁶	59.5 ¹⁸
25.9	57.50 ⁵⁶	21.8 ²⁸	18.78 ³⁰	33.1 ²⁵	50.27 ²⁴²	74.1 ¹⁷	24.10 ²³	61.3 ¹⁹
Dec. 5.9	58.06 ⁶⁵	18.5 ²⁸	19.05 ³⁰	30.6 ²⁵	52.69 ²⁷²	72.4 ¹¹	24.36 ³⁰	63.2 ²⁰
15.8	58.71 ⁷⁴	15.7 ²⁴	19.35 ³²	28.1 ²⁴	55.41 ²⁹²	71.3 ⁴	24.66 ³²	65.2 ²¹
25.8	59.45 ⁸⁰	13.3 ¹⁷	19.67 ³⁴	25.7 ²³	58.33 ³⁰⁴	70.9 ¹	24.98 ³⁴	67.3 ²²
35.8	60.25	11.6	20.01	23.4	61.37	71.0	25.32	69.5
Sec δ, Tan δ	3.387	+3.236	1.032	+0.254	12.347	-12.306	1.000	-0.003
Mean Place	57°.867	57''.36	16°.359	56''.80	56°.42*	64''.95	21°.625	41''.83
D'ψ α, D ₀ α	-0.03	+0.20	0.00	+0.02	+0.12	-0.76	0.00	0.00
D'ψ δ, D ₀ δ	-0.4	-0.4	-0.4	-0.4	-0.4	-0.4	-0.4	-0.4

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	17 H. Canum Venat. Mag. 5.0		ε Centauri. Mag. 2.6		m Virginis. Mag. 5.2		γ Boötis. Mag. 4.5	
	Right Ascension.	Declination N.	Right Ascension.	Declination S.	Right Ascension.	Declination S.	Right Ascension.	Declination N.
	h m 13 31	° ' " + 37 36	h m 13 34	° ' " - 53 1	h m 13 37	° ' " - 8 16	h m 13 43	° ' " + 17 52
Jan. 0.8	0.64	44.1	29.10	56.4	9.06	33.0	13.63	34.0
10.8	1.03	39 42.0	29.61	57.6	9.40	35.0	13.97	31.8
20.7	1.41	38 40.4	30.11	59.3	9.74	37.0	14.31	29.9
30.7	1.78	37 39.4	30.59	61.3	10.07	39.0	14.64	28.3
Feb. 9.7	2.13	35 38.9	31.04	63.7	10.38	40.8	14.95	27.2
19.7	2.46	28 38.9	31.45	66.3	10.66	42.4	15.24	26.4
Mar. 1.6	2.74	23 39.5	31.82	69.1	10.91	43.8	15.50	26.1
11.6	2.97	20 40.5	32.14	72.0	11.13	45.0	15.72	26.2
21.6	3.17	14 41.9	32.40	75.0	11.31	45.9	15.90	26.6
31.5	3.31	10 43.7	32.61	77.9	11.45	46.6	16.05	27.4
Apr. 10.5	3.41	5 45.8	32.77	80.8	11.56	47.1	16.16	28.5
20.5	3.46	5 48.0	32.88	83.6	11.65	47.4	16.24	29.8
30.5	3.47	1 50.2	32.94	86.2	11.70	47.5	16.28	31.2
May 10.4	3.45	2 52.4	32.96	88.5	11.73	47.4	16.29	32.6
20.4	3.39	9 54.5	32.92	90.7	11.73	47.2	16.28	34.1
30.4	3.30	11 56.4	32.85	92.5	11.71	46.9	16.25	35.5
June 9.4	3.19	17 58.1	32.74	94.0	11.66	46.6	16.19	36.8
19.3	3.06	13 59.5	32.59	95.1	11.60	46.1	16.11	38.0
29.3	2.91	15 60.6	32.41	95.9	11.53	45.6	16.02	39.0
July 9.3	2.75	16 61.3	32.21	96.2	11.44	45.1	15.91	39.8
19.2	2.59	17 61.6	31.99	96.2	11.33	44.5	15.79	40.4
29.2	2.42	17 61.5	31.76	95.7	11.22	43.9	15.67	40.7
Aug. 8.2	2.25	17 61.0	31.53	94.8	11.11	43.4	15.54	40.8
18.2	2.09	16 60.1	31.30	93.6	11.00	42.8	15.41	40.6
28.1	1.94	15 58.9	31.09	92.0	10.90	42.4	15.30	40.2
Sept. 7.1	1.81	10 57.3	30.92	90.2	10.81	42.0	15.19	39.4
17.1	1.71	10 55.3	30.79	88.1	10.75	41.7	15.11	38.4
27.1	1.65	6 53.0	30.71	85.9	10.72	41.6	15.06	37.2
Oct. 7.0	1.62	3 50.4	30.69	83.7	10.72	41.6	15.04	35.6
17.0	1.65	3 47.6	30.74	81.6	10.76	41.9	15.06	33.8
27.0	1.72	44.6	30.87	79.6	10.85	42.4	15.13	31.8
Nov. 5.9	1.85	13 41.4	31.08	77.8	10.98	43.2	15.25	29.5
15.9	2.03	18 38.2	31.36	76.4	11.17	44.3	15.41	27.1
25.9	2.27	24 35.0	31.70	75.4	11.40	45.6	15.62	24.5
Dec. 5.9	2.55	33 31.8	32.11	74.8	11.66	47.1	15.88	21.9
15.8	2.88	28.9	32.56	74.7	11.96	48.9	16.17	19.3
25.8	3.23	26.2	33.05	75.1	12.29	50.8	16.48	16.8
35.8	3.60	23.9	33.56	76.0	12.63	52.8	16.82	14.4
Sec δ, Tan δ	1.262	+0.770	1.663	-1.329	1.011	-0.145	1.051	+0.322
Mean Place	0°.209	63''.52	29°.567	65''.10	8°.910	28''.09	13°.369	47''.83
D'ψ α, D _α α	-0.01	+0.05	+0.01	-0.08	0.00	-0.01	0.00	+0.02
D'δ, D _δ δ	-0.4	-0.4	-0.4	-0.4	-0.4	-0.4	-0.4	-0.4

FOR THE UPPER TRANSIT AT WASHINGTON.

Solar etc.	77 Ursæ Majoris. (Alkaid.) Mag. 1.9		89 Virginis. Mag. 5.1		ζ Centauri. Mag. 3.1		7 Boötis. Mag. 2.8	
	Right Ascension.	Declina- tion N.	Right Ascension.	Declina- tion S.	Right Ascension.	Declina- tion S.	Right Ascension.	Declina- tion N.
	h m 13 44	° ' " +49 43	h m 13 45	° ' " -17 42	h m 13 50	° ' " -46 52	h m 13 50	° ' " +18 48
0.8	11.95	51.3	15.01	42.0	13.36	7.2	38.47	70.0
10.8	12.38 43	49.3 20	15.37 36	43.9 19	13.82 46	8.4 12	38.81 34	67.7 23
20.7	12.82 44	47.8 15	15.72 35	45.8 19	14.28 46	9.9 15	39.15 34	65.8 19
30.7	13.26 44	46.9 9	16.06 34	47.8 20	14.72 44	11.8 19	39.49 34	64.2 12
9.7	13.67 41	46.6 3	16.38 32	49.8 20	15.14 42	14.0 22	39.81 32	63.0 12
	38	4	29	19	39	24	29	7
19.7	14.05	47.0	16.67	51.7	15.53	16.4	40.10	62.3
1.6	14.39 34	47.9 9	16.93 26	53.4 17	15.88 35	18.9 25	40.36 26	62.0 3
11.6	14.68 29	49.3 14	17.16 23	55.0 16	16.18 30	21.5 26	40.59 23	62.1 1
21.6	14.91 23	51.2 19	17.36 20	56.4 14	16.44 26	24.2 27	40.78 19	62.6 5
31.6	15.08 17	53.5 23	17.52 16	57.6 12	16.66 22	26.8 26	40.93 15	63.4 8
	12	25	13	10	17	26	12	11
10.5	15.20	56.0	17.65	58.6	16.83	29.4	41.05	64.5
20.5	15.26 6	58.6 26	17.74 9	59.5 9	16.96 13	31.8 24	41.14 9	65.8 13
30.5	15.27 1	61.3 27	17.81 7	60.1 6	17.04 8	34.1 23	41.19 5	67.3 15
10.4	15.23 4	63.9 26	17.84 3	60.6 5	17.09 5	36.2 21	41.21 2	68.8 15
20.4	15.14 9	66.4 25	17.85 1	60.9 3	17.09 0	38.1 19	41.20 1	70.3 15
	12	22	1	2	3	16	3	15
30.4	15.02	68.6	17.84	61.1	17.06	39.7	41.17	71.8
9.4	14.86 16	70.5 19	17.81 3	61.1 0	16.99 7	41.0 13	41.12 5	73.2 14
19.3	14.68 18	72.1 16	17.75 6	61.0 1	16.88 11	42.0 10	41.04 8	74.4 12
29.3	14.47 21	73.2 11	17.67 8	60.7 3	16.75 13	42.7 7	40.95 9	75.4 9
y 9.3	14.24 23	74.0 8	17.58 9	60.4 3	16.59 16	43.1 4	40.84 11	76.3 9
	24	3	11	5	18	1	12	6
19.3	14.00	74.3	17.47	59.9	16.41	43.0	40.72	76.9
29.2	13.76 24	74.1 2	17.36 11	59.3 6	16.22 19	42.6 4	40.60 12	77.2 3
g. 8.2	13.52 24	73.4 7	17.24 12	58.6 7	16.02 20	41.9 7	40.47 13	77.3 1
18.2	13.29 23	72.3 11	17.12 12	57.9 7	15.82 20	40.9 10	40.34 13	77.1 2
28.1	13.08 21	70.7 16	17.01 11	57.2 7	15.64 18	39.5 14	40.22 12	76.6 5
	19	19	10	7	16	16	11	7
pt. 7.1	12.89	68.8	16.91	56.5	15.48	37.9	40.11	75.9
17.1	12.73 16	66.4 24	16.83 8	55.8 7	15.35 13	36.1 18	40.02 9	74.9 10
27.1	12.61 12	63.7 27	16.79 4	55.1 7	15.27 8	34.2 19	39.96 6	73.6 13
t. 7.0	12.54 7	60.7 30	16.78 1	54.6 5	15.24 3	32.3 19	39.93 3	72.0 16
17.0	12.52 2	57.5 32	16.82 4	54.3 3	15.27 3	30.4 19	39.95 2	70.1 19
	5	35	8	0	10	17	6	21
27.0	12.57	54.0	16.90	54.3	15.37	28.7	40.01	68.0
ov. 6.0	12.68 11	50.5 35	17.04 14	54.5 2	15.54 17	27.2 15	40.12 11	65.7 23
15.9	12.85 17	46.9 36	17.22 18	54.9 4	15.77 23	25.9 13	40.27 15	63.2 25
25.9	13.09 24	43.4 35	17.45 23	55.7 8	16.07 30	25.1 8	40.48 21	60.6 26
ec. 5.9	13.38 29	40.0 34	17.73 28	56.8 11	16.42 35	24.7 4	40.73 25	57.9 27
	35	31	31	13	40	0	28	26
15.8	13.73	36.9	18.04	58.1	16.82	24.7	41.01	55.3
25.8	14.12 39	34.1 28	18.37 33	59.7 16	17.26 44	25.1 4	41.33 32	52.8 25
35.8	14.54 42	31.8 23	18.72 35	61.4 17	17.71 45	26.0 9	41.66 33	50.4 24
δ, Tan δ	1.547	+1.181	1.050	-0.319	1.463	-1.068	1.056	+0.341
an Place	11°.605	73'''.63	14°.978	40'''.10	13°.771	13'''.73	38°.254	84'''.20
α, D _α α	-0.01	+0.07	0.00	-0.02	+0.01	-0.06	0.00	+0.02
δ, D _δ δ	-0.4	-0.4	-0.4	-0.4	-0.4	-0.5	-0.4	-0.5

[Eph 15]

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	θ Apodis. Var. 5.5-6.6		τ Virginis. Mag. 4.3		11 Boötis. Mag. 6.1		β Centauri. Mag. 0.9	
	Right Ascension.	Declination S.	Right Ascension.	Declination N.	Right Ascension.	Declination N.	Right Ascension.	Declination S.
	h m 13 56	° ' -76 23	h m 13 57	° ' + 1 56	h m 13 57	° ' + 27 47	h m 13 57	° ' -59 57
	s 13 56	" 23	s 13 57	" 56	s 13 57	" 47	s 13 57	" 57
Jan. 0.8	57.52	2.2	19.27	70.7	19.48	31.0	47.91	39.4
10.8	58.65 ¹¹³	2.5 3	19.60 ³³	68.6 ²¹	19.83 ³⁵	28.7 ²³	48.50 ⁵⁹	40.2 ⁸
20.7	59.79 ¹¹⁴	3.4 9	19.93 ³³	66.6 ²⁰	20.19 ³⁶	26.9 ¹⁸	49.09 ⁵⁹	41.4 ¹²
30.7	60.90 ¹¹¹	4.8 ¹⁴	20.26 ³³	64.8 ¹⁸	20.54 ³⁵	25.4 ¹⁵	49.67 ⁵⁸	43.1 ¹⁷
Feb. 9.7	61.97 ¹⁰⁷	6.8 ²⁰	20.57 ³¹	63.2 ¹⁶	20.87 ³³	24.4 ¹⁰	50.22 ⁵⁵	45.2 ²¹
	99	23	29	13	31	5	51	23
19.7	62.96	9.1	20.86	61.9	21.18	23.9	50.73	47.5
Mar. 1.6	63.86	11.9 ²⁸	21.12 ²⁶	61.0 ⁹	21.46 ²⁸	24.0 ¹	51.19 ⁴⁶	50.2 ²⁷
11.6	64.66 ⁸⁰	14.9 ³⁰	21.35 ²³	60.3 ⁷	21.70 ²⁴	24.4 ⁴	51.60 ⁴¹	53.0 ²⁸
21.6	65.33 ⁶⁷	18.2 ³³	21.55 ²⁰	59.9 ⁴	21.90 ²⁰	25.4 ¹⁰	51.95 ³⁵	56.0 ³⁰
31.6	65.88 ⁵⁵	21.6 ³⁴	21.71 ¹⁶	59.8 ¹	22.07 ¹⁷	26.7 ¹³	52.24 ²⁹	59.1 ³¹
	42	35	13	2	12	15	23	30
Apr. 10.5	66.30	25.1	21.84	60.0	22.19	28.2	52.47	62.1
20.5	66.59 ²⁹	28.6 ³⁵	21.93 ⁹	60.4 ⁴	22.28 ⁹	30.0 ¹⁸	52.64 ¹⁷	65.1 ³⁰
30.5	66.74 ¹⁵	32.0 ³⁴	22.00 ⁷	60.9 ⁵	22.33 ⁵	31.9 ¹⁹	52.75 ¹¹	68.0 ²⁹
May 10.4	66.76 ²	35.3 ³³	22.04 ⁴	61.6 ⁷	22.35 ²	33.9 ²⁰	52.80 ⁵	70.7 ²⁷
20.4	66.65 ¹¹	38.4 ³¹	22.06 ²	62.3 ⁷	22.34 ¹	35.8 ¹⁹	52.80 ⁰	73.2 ²⁵
	24	29	1	9	4	18	7	22
30.4	66.41	41.3	22.05	63.2	22.30	37.6	52.73	75.4
June 9.4	66.04 ³⁷	43.8 ²⁵	22.02 ³	64.0 ⁸	22.23 ⁷	39.3 ¹⁷	52.62 ¹¹	77.3 ¹⁹
19.3	65.58 ⁴⁶	45.9 ²¹	21.96 ⁶	64.8 ⁸	22.14 ⁹	40.8 ¹⁵	52.45 ¹⁷	78.9 ¹⁰
29.3	65.01 ⁵⁷	47.6 ¹⁷	21.89 ⁷	65.5 ⁷	22.03 ¹¹	42.0 ¹²	52.24 ²¹	80.1 ¹²
July 9.3	64.37 ⁶⁴	48.8 ¹²	21.80 ⁹	66.2 ⁷	21.91 ¹²	42.9 ⁹	51.99 ²⁵	80.8 ⁷
	70	7	10	6	14	6	27	3
19.3	63.67	49.5	21.70	66.8	21.77	43.5	51.72	81.1
29.2	62.93 ⁷⁴	49.6 ¹	21.59 ¹¹	67.4 ⁶	21.62 ¹⁵	43.8 ³	51.42 ³⁰	81.0 ¹
Aug. 8.2	62.18 ⁷⁵	49.2 ⁴	21.47 ¹²	67.8 ⁴	21.47 ¹⁵	43.8 ⁰	51.12 ³⁰	80.4 ⁶
18.2	61.45 ⁷³	48.3 ⁹	21.36 ¹¹	68.0 ²	21.32 ¹⁵	43.4 ⁴	50.82 ³⁰	79.4 ¹⁰
28.1	60.77 ⁶⁸	46.9 ¹⁴	21.24 ¹²	68.2 ²	21.18 ¹⁴	42.7 ⁷	50.54 ²⁸	78.0 ¹⁴
	61	19	10	0	13	11	25	18
Sept. 7.1	60.16	45.0	21.14	68.2	21.05	41.6	50.29	76.2
17.1	59.66 ⁵⁰	42.7 ²³	21.06 ⁸	68.0 ²	20.95 ¹⁰	40.2 ¹⁴	50.08 ²¹	74.2 ²⁰
27.1	59.29 ³⁷	40.1 ²⁶	21.01 ⁵	67.5 ⁵	20.87 ⁸	38.5 ¹⁷	49.94 ¹⁴	71.9 ²³
Oct. 7.0	59.08 ²¹	37.3 ²⁸	20.99 ²	66.9 ⁶	20.83 ⁴	36.5 ²⁰	49.87 ⁷	69.5 ²⁴
17.0	59.04 ⁴	34.4 ²⁹	21.01 ²	66.0 ⁹	20.82 ¹	34.2 ²³	49.88 ¹	67.1 ²⁴
	14	29	6	11	5	25	10	23
27.0	59.18	31.5	21.07	64.9	20.87	31.7	49.98	64.8
Nov. 6.0	59.51 ³³	28.7 ²⁸	21.18 ¹¹	63.6 ¹³	20.97 ¹⁰	29.0 ²⁷	50.17 ¹⁹	62.6 ²²
15.9	60.02 ⁵¹	26.2 ²⁵	21.34 ¹⁶	62.0 ¹⁶	21.12 ¹⁵	26.1 ²⁰	50.46 ²⁹	60.7 ¹⁹
25.9	60.71 ⁶⁹	24.1 ²¹	21.54 ²⁰	60.2 ¹⁸	21.32 ²⁰	23.1 ³⁰	50.82 ³⁶	59.1 ¹⁶
Dec. 5.9	61.54 ⁸³	22.3 ¹⁸	21.79 ²⁵	58.2 ²⁰	21.56 ²⁴	20.2 ²⁹	51.26 ⁴⁴	58.0 ¹¹
	95	12	28	20	29	29	51	6
15.8	62.49	21.1	22.07	56.2	21.85	17.3	51.77	57.4
25.8	63.54 ¹⁰⁵	20.4 ⁷	22.38 ³¹	54.0 ²²	22.17 ³²	14.6 ²⁷	52.32 ⁵⁵	57.3 ¹
35.8	64.65 ¹¹¹	20.3 ¹	22.70 ³²	51.9 ²¹	22.51 ³⁴	12.1 ²⁵	52.90 ⁵⁸	57.7 ⁴
Sec δ , Tan δ	4.250	-4.130	1.001	+0.034	1.130	+0.527	1.098	-1.730
Mean Place	60° 21.3	13° 79	19° 16.5	79° 56	19° 28.6	47° 97	48° 81.9	48° 55
D' ψ a, D _a a	+0.05	-0.24	0.00	0.00	-0.01	+0.03	+0.02	-0.10
D ψ δ , D _a δ	-0.3	-0.5	-0.3	-0.5	-0.3	-0.5	-0.3	-0.5

FOR THE UPPER TRANSIT AT WASHINGTON.

m Solar Date.	π Hydræ. Mag. 3.5		θ Centauri. Mag. 2.3		α Draconis. Mag. 3.6		d Boötis. Mag. 4.8	
	Right Ascension.	Declination S.	Right Ascension.	Declination S.	Right Ascension.	Declination N.	Right Ascension.	Declination N.
	h m 14 1	° ' " -26 16	h m 14 1	° ' " -35 57	h m 14 2	° ' " +64 46	h m 14 6	° ' " +25 29
l. 0.8	31.49	24.0	40.21	5.0	5.33	29.8	31.51	21.2
10.8	31.86 ³⁷	25.6 ¹⁶	40.61 ⁴⁰	6.4 ¹⁴	5.91 ⁵⁸	27.8 ²⁰	31.86 ³⁵	18.9 ²³
20.8	32.23 ³⁷	27.4 ¹⁸	41.01 ⁴⁰	8.0 ¹⁶	6.51 ⁶⁰	26.4 ¹⁴	32.21 ³⁵	17.0 ¹⁹
30.7	32.59 ³⁶	29.2 ¹⁸	41.41 ⁴⁰	9.9 ¹⁹	7.11 ⁶⁰	25.7 ⁷	32.55 ³⁴	15.4 ¹⁶
b. 9.7	32.93 ³⁴	31.2 ²⁰	41.78 ³⁷	11.9 ²⁰	7.70 ⁵⁹	25.6 ¹	32.88 ³³	14.3 ¹¹
	32 ³²	20 ²⁰	34 ³⁴	22 ²²	55 ⁵⁵	6 ⁶	31 ³¹	6 ⁶
19.7	33.25	33.2	42.12	14.1	8.25	26.2	33.19	13.7
r. 1.6	33.54	35.1 ¹⁹	42.43 ³¹	16.3 ²²	8.74 ⁴⁹	27.4 ¹²	33.47 ²⁸	13.6 ¹
11.6	33.80	37.0 ¹⁹	42.71 ²⁸	18.5 ²²	9.16 ⁴²	29.2 ¹⁸	33.72 ²⁵	14.0 ⁴
21.6	34.02 ²²	38.8 ¹⁸	42.95 ²⁴	20.7 ²²	9.51 ³⁵	31.4 ²²	33.93 ²¹	14.8 ⁸
31.6	34.21 ¹⁹	40.4 ¹⁶	43.16 ²¹	22.8 ²¹	9.77 ²⁶	34.0 ²⁶	34.11 ¹⁸	15.9 ¹¹
	15 ¹⁵	14 ¹⁴	16 ¹⁶	20 ²⁰	17 ¹⁷	29 ²⁹	13 ¹³	15 ¹⁵
10.5	34.36	41.8	43.32	24.8	9.94	36.9	34.24	17.4
20.5	34.48 ¹²	43.1 ¹³	43.45 ¹³	26.6 ¹⁸	10.02 ⁸	39.9 ³⁰	34.34 ¹⁰	19.0 ¹⁶
30.5	34.57 ⁹	44.3 ¹²	43.54 ⁹	28.3 ¹⁷	10.02 ⁰	42.9 ³⁰	34.40 ⁶	20.9 ¹⁹
ay 10.5	34.63 ⁶	45.3 ¹⁰	43.60 ⁶	29.9 ¹⁶	9.94 ⁸	45.8 ²⁹	34.43 ³	22.8 ¹⁹
20.4	34.65 ²	46.1 ⁶	43.63 ³	31.2 ¹³	9.78 ¹⁶	48.6 ²⁸	34.43 ⁰	24.6 ¹⁸
	0 ⁰	6 ⁶	1 ¹	11 ¹¹	23 ²³	25 ²⁵	3 ³	18 ¹⁸
30.4	34.65	46.7	43.62	32.3	9.55	51.1	34.40	26.4
ine 9.4	34.62 ³	47.1 ⁴	43.58 ⁴	33.2 ⁹	9.27 ²⁸	53.2 ²¹	34.35 ⁵	28.1 ¹⁷
19.3	34.57 ⁵	47.3 ²	43.51 ⁷	33.9 ⁷	8.94 ³³	55.0 ¹⁸	34.27 ⁸	29.6 ¹⁵
29.3	34.49 ⁸	47.4 ¹	43.42 ⁹	34.3 ⁴	8.56 ³⁸	56.2 ¹²	34.17 ¹⁰	30.8 ¹²
uly 9.3	34.40 ⁹	47.3 ³	43.30 ¹³	34.4 ¹	8.15 ⁴¹	57.0 ⁸	34.05 ¹²	31.8 ¹⁰
	12 ¹²	3 ³	13 ¹³	1 ¹	42 ⁴²	2 ²	13 ¹³	7 ⁷
19.3	34.28	47.0	43.17	34.3	7.73	57.2	33.92	32.5
29.2	34.15 ¹³	46.5 ⁵	43.02 ¹⁵	33.9 ⁴	7.30 ⁴³	57.0 ²	33.77 ¹⁵	32.9 ⁴
ug. 8.2	34.02 ¹³	45.8 ⁷	42.86 ¹⁶	33.3 ⁶	6.86 ⁴⁴	56.2 ⁸	33.62 ¹⁵	33.0 ¹
18.2	33.88 ¹⁴	45.1 ⁷	42.70 ¹⁶	32.4 ⁹	6.44 ⁴²	54.9 ¹³	33.48 ¹⁴	32.7 ³
28.2	33.75 ¹³	44.2 ⁹	42.55 ¹⁵	31.3 ¹¹	6.05 ³⁹	53.2 ¹⁷	33.33 ¹⁵	32.1 ⁶
	11 ¹¹	10 ¹⁰	14 ¹⁴	12 ¹²	36 ³⁶	23 ²³	13 ¹³	9 ⁹
pt. 7.1	33.64	43.2	42.41	30.1	5.69	50.9	33.20	31.2
17.1	33.54 ¹⁰	42.2 ¹⁰	42.30 ¹¹	28.7 ¹⁴	5.37 ³²	48.3 ²⁶	33.09 ¹¹	30.0 ¹²
27.1	33.48 ⁶	41.2 ¹⁰	42.23 ⁷	27.3 ¹⁴	5.11 ²⁶	45.3 ³⁰	33.01 ⁸	28.4 ¹⁶
st. 7.0	33.46 ²	40.2 ¹⁰	42.20 ³	25.9 ¹⁴	4.92 ¹⁹	42.0 ³³	32.96 ⁵	26.5 ¹⁹
17.0	33.48 ²	39.4 ⁸	42.22 ²	24.6 ¹³	4.81 ¹¹	38.4 ³⁶	32.95 ¹	24.4 ²¹
	7 ⁷	6 ⁶	7 ⁷	12 ¹²	3 ³	37 ³⁷	4 ⁴	24 ²⁴
27.0	33.55	38.8	42.29	23.4	4.78	34.7	32.99	22.0
ov. 6.0	33.68 ¹³	38.4 ⁴	42.42 ¹³	22.5 ⁹	4.84 ⁶	30.8 ³⁹	33.08 ⁹	19.4 ²⁶
15.9	33.86 ¹⁸	38.3 ¹	42.62 ²⁰	21.8 ⁷	5.01 ¹⁷	27.0 ³⁸	33.22 ¹⁴	16.6 ²⁸
25.9	34.09 ²³	38.6 ³	42.87 ²⁵	21.5 ³	5.26 ²⁵	23.2 ³⁸	33.40 ¹⁸	13.7 ²⁹
ec. 5.9	34.36 ²⁷	39.1 ⁵	43.17 ³⁰	21.5 ⁰	5.60 ³⁴	19.7 ³⁵	33.64 ²⁴	10.8 ²⁹
	32 ³²	8 ⁸	34 ³⁴	4 ⁴	43 ⁴³	32 ³²	28 ²⁸	29 ²⁹
15.9	34.68	39.9	43.51	21.9	6.03	16.5	33.92	7.9
25.8	35.02 ³⁴	41.1 ¹²	43.88 ³⁷	22.7 ⁸	6.52 ⁴⁹	13.6 ²⁹	34.23 ³¹	5.2 ²⁷
35.8	35.38 ³⁶	42.5 ¹⁴	44.27 ³⁹	23.8 ¹¹	7.07 ⁵⁵	11.3 ²³	34.56 ³³	2.7 ²⁵
δ , Tan δ	1.115	-0.494	1.235	-0.725	2.347	+2.123	1.108	+0.477
m Place	31°.624	24''.30	40°.478	8''.32	5°.304	54''.53	31°.390	37''.59
a , D_a	+0.01	-0.03	+0.01	-0.04	-0.03	+0.12	-0.01	+0.03
b , D_b	-0.3	-0.5	-0.3	-0.5	-0.3	-0.5	-0.3	-0.5

[Eph 13]

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	κ Virginis. Mag. 4.3		4 Ursæ Minoris. Mag. 5.0		2 Virginis. Mag. 4.2		α Boëtis. (Arcturus.) Mag. 0.2	
	Right Ascension.	Declination S.	Right Ascension.	Declination N.	Right Ascension.	Declination S.	Right Ascension.	Declination N.
	h m 14 8	° ' " — 9 52	h m 14 9	° ' " + 77 56	h m 14 11	° ' " — 5 35	h m 14 11	° ' " + 19 36
Jan. 0.8	21.53	48.0	8.94	23.1	33.29	49.9	47.11	73.4
10.8	21.87 ³⁴	49.9 ¹⁹	9.97 ¹⁰³	21.2 ¹⁹	33.62 ³³	51.9 ²⁰	47.44 ³³	71.0 ²⁴
20.8	22.21 ³⁴	51.8 ¹⁹	11.07 ¹¹⁰	20.0 ¹²	33.96 ³⁴	53.8 ¹⁹	47.78 ³⁴	69.0 ²⁰
30.7	22.55 ³⁴	53.7 ¹⁹	12.18 ¹¹¹	19.4 ⁶	34.29 ³³	55.7 ¹⁹	48.12 ³⁴	67.3 ¹⁷
Feb. 9.7	22.87 ³²	55.4 ¹⁷	13.28 ¹¹⁰	19.5 ¹	34.61 ³²	57.4 ¹⁷	48.44 ³²	66.0 ¹³
19.7	23.17 ³⁰	57.0 ¹⁶	14.32 ¹⁰⁴	20.3 ⁸	34.91 ³⁰	58.9 ¹⁵	48.74 ³⁰	65.1 ⁹
Mar. 1.6	23.44 ²⁷	58.4 ¹⁴	15.26 ⁹⁴	21.7 ¹⁴	35.18 ²⁷	60.1 ¹²	49.02 ²⁸	64.8 ³
11.6	23.68 ²⁴	59.6 ¹²	16.07 ⁸¹	23.7 ²⁰	35.42 ²⁴	61.1 ¹⁰	49.26 ²⁴	64.8 ⁰
21.6	23.89 ²¹	60.5 ⁹	16.73 ⁶⁶	26.1 ²⁴	35.63 ²¹	61.9 ⁸	49.46 ²⁰	65.2 ⁴
31.6	24.07 ¹⁸	61.2 ⁷	17.21 ⁴⁸	28.9 ²⁸	35.81 ¹⁸	62.4 ⁵	49.64 ¹⁸	66.0 ⁸
Apr. 10.5	24.22 ¹⁵	61.7 ⁵	17.52 ³¹	31.9 ³⁰	35.95 ¹⁴	62.6 ²	49.78 ¹⁴	67.1 ¹¹
20.5	24.33 ¹¹	62.0 ³	17.63 ¹¹	35.0 ³¹	36.07 ¹²	62.7 ¹	49.88 ¹⁰	68.4 ¹³
30.5	24.42 ⁹	62.2 ²	17.56 ⁷	38.1 ³¹	36.16 ⁹	62.6 ¹	49.95 ⁷	69.9 ¹⁵
May 10.5	24.48 ⁶	62.2 ⁰	17.31 ²⁵	41.1 ³⁰	36.22 ⁶	62.3 ³	49.99 ⁴	71.5 ¹⁶
20.4	24.51 ³	62.0 ²	16.89 ⁴²	43.9 ²⁸	36.25 ³	61.9 ⁴	50.00 ¹	73.1 ¹⁶
30.4	24.51 ⁰	61.8 ²	16.33 ⁵⁶	46.4 ²⁵	36.25 ⁰	61.5 ⁴	49.98 ²	74.7 ¹⁵
June 9.4	24.49 ²	61.4 ⁴	15.64 ⁶⁹	48.5 ²¹	36.23 ²	61.0 ⁵	49.93 ⁵	76.2 ¹⁵
19.3	24.45 ⁴	61.0 ⁴	14.84 ⁸⁰	50.2 ¹⁷	36.19 ⁴	60.4 ⁶	49.87 ⁶	77.5 ¹³
29.3	24.38 ⁷	60.6 ⁴	13.96 ⁸⁸	51.4 ¹²	36.13 ⁶	59.8 ⁶	49.78 ⁹	78.6 ¹¹
July 9.3	24.30 ⁸	60.1 ⁵	13.01 ⁹⁵	52.0 ⁶	36.05 ⁸	59.3 ⁵	49.67 ¹¹	79.5 ⁹
19.3	24.20 ¹¹	59.6 ⁶	12.02 ¹⁰⁰	52.1 ⁴	35.95 ¹¹	58.7 ⁵	49.55 ¹³	80.2 ⁴
29.2	24.09 ¹²	59.0 ⁵	11.02 ⁹⁹	51.7 ⁹	35.84 ¹²	58.2 ⁵	49.42 ¹⁴	80.6 ²
Aug. 8.2	23.97 ¹²	58.5 ⁵	10.03 ⁹⁷	50.8 ¹⁵	35.72 ¹²	57.7 ⁴	49.28 ¹⁴	80.8 ²
18.2	23.85 ¹²	58.0 ⁵	9.06 ⁹⁷	49.3 ¹⁹	35.60 ¹²	57.3 ⁴	49.14 ¹⁴	80.6 ²
28.2	23.73 ¹⁰	57.5 ⁵	8.14 ⁸⁴	47.4 ²⁴	35.48 ¹¹	56.9 ²	49.00 ¹³	80.2 ⁴
Sept. 7.1	23.63 ⁹	57.0 ³	7.30 ⁷⁵	45.0 ²⁸	35.37 ⁹	56.7 ²	48.87 ¹¹	79.5 ¹⁰
17.1	23.54 ⁶	56.7 ²	6.55 ⁶³	42.2 ³²	35.28 ⁶	56.5 ¹	48.76 ⁸	78.5 ¹⁴
27.1	23.48 ³	56.5 ⁰	5.92 ⁵⁰	39.0 ³⁵	35.22 ⁴	56.6 ²	48.68 ⁵	77.1 ¹⁶
Oct. 7.0	23.45 ¹	56.6 ¹	5.42 ³⁵	35.5 ³⁶	35.18 ⁶	56.8 ⁴	48.63 ⁴	75.5 ¹⁰
17.0	23.46 ⁶	56.6 ⁴	5.07 ¹⁸	31.9 ³⁹	35.19 ¹	57.2 ⁶	48.62 ⁴	73.6 ²¹
27.0	23.52 ¹⁰	57.0 ⁶	4.89 ⁰	28.0 ³⁹	35.25 ¹⁰	57.8 ⁹	48.66 ⁸	71.5 ²³
Nov. 6.0	23.62 ¹⁰	57.6 ⁶	4.89 ¹⁸	24.1 ³⁹	35.35 ¹⁰	58.7 ⁹	48.74 ⁸	69.2 ²⁶
15.9	23.78 ¹⁶	58.5 ⁹	5.07 ³⁶	20.3 ³⁸	35.50 ¹⁵	59.8 ¹⁴	48.87 ¹³	66.6 ²⁷
25.9	23.98 ²⁵	59.6 ¹³	5.43 ⁵⁴	16.6 ³⁵	35.69 ²⁴	61.2 ¹⁵	49.05 ²³	63.9 ²⁸
Dec. 5.9	24.23 ²⁸	60.9 ¹⁶	5.97 ⁷¹	13.1 ³²	35.93 ²⁸	62.7 ¹⁸	49.28 ²⁷	61.1 ²⁷
15.9	24.51 ³¹	62.5 ¹⁷	6.68 ⁸⁵	9.9 ²⁷	36.21 ³⁰	64.5 ¹⁹	49.55 ³⁰	58.4 ²⁶
25.8	24.82 ³³	64.2 ¹⁸	7.53 ⁹⁷	7.2 ²²	36.51 ³³	66.4 ¹⁹	49.85 ³²	55.8 ²⁵
35.8	25.15	66.0	8.50	5.0	36.84	68.3	50.17	53.3
Sec δ , Tan δ	1.015	-0.174	4.787	+4.681	1.005	-0.098	1.062	+0.356
Mean Place	21 ^h .561	42 ^m .89	9 ^h .611	48 ^m .72	33 ^h .307	43 ^m .30	47 ^h .030	88 ^m .04
D' ψ a, D ₀ 1	0.00	-0.01	-0.07	+0.26	0.00	-0.01	-0.01	+0.02
D ψ δ , D ₀ δ	-0.3	-0.5	-0.3	-0.5	-0.3	-0.5	-0.3	-0.5

FOR THE UPPER TRANSIT AT WASHINGTON.

Sun Solar Date.	λ Boëtis. Mag. 4.3		λ Virginis. Mag. 4.6		γ Libræ. Mag. 6.3		θ Boëtis. Mag. 4.1	
	Right Ascension.	Declination N.	Right Ascension.	Declination S.	Right Ascension.	Declination S.	Right Ascension.	Declination N.
	h m 14 13	° ' " +46 28	h m 14 14	° ' " -12 58	h m 14 18	° ' " -11 19	h m 14 22	° ' " +52 13
a. 0.8	9.28	19.9	30.35	53.7	50.94	39.7	18.14	73.0
10.8	9.68 ⁴⁰	17.6 ²³	30.69 ³⁴	55.5 ¹⁸	51.28 ³⁴	41.6 ¹⁹	18.57 ⁴³	70.6 ²⁴
20.8	10.10 ⁴²	15.8 ¹⁸	31.04 ³⁵	57.3 ¹⁸	51.62 ³⁴	43.4 ¹⁸	19.02 ⁴⁵	68.8 ¹⁸
30.7	10.51 ⁴¹	14.5 ¹³	31.38 ³⁴	59.1 ¹⁸	51.96 ³⁴	45.2 ¹⁸	19.47 ⁴⁵	67.6 ¹²
b. 9.7	10.91 ⁴⁰	13.9 ⁶	31.70 ³²	60.9 ¹⁶	52.28 ³²	47.0 ¹⁶	19.91 ⁴⁴	66.9 ⁷
19.7	11.29	13.9	32.01	62.5	52.59	48.6	20.33	67.0
r. 1.7	11.64 ³⁵	14.4 ⁵	32.28 ²⁷	64.0 ¹⁵	52.87 ²⁸	50.0 ¹⁴	20.71 ³⁸	67.6
11.6	11.94 ³⁰	15.6 ¹²	32.53 ²⁵	65.3 ¹³	53.12 ²⁵	51.2 ¹²	21.05 ³⁴	68.8 ¹²
21.6	12.19 ²⁵	17.2 ¹⁶	32.75 ²²	66.4 ¹¹	53.34 ²²	52.2 ¹⁰	21.34 ²⁹	70.6 ¹⁸
31.6	12.40 ²¹	19.2 ²⁰	32.94 ¹⁹	67.2 ⁸	53.52 ¹⁸	52.9 ⁷	21.57 ²³	72.8 ²²
15		24	15	7	16	6	17	25
r. 10.5	12.55	21.6	33.09	67.9	53.68	53.5	21.74	75.3
20.5	12.66 ¹¹	24.1 ²⁵	33.21 ¹²	68.4 ⁵	53.81 ¹³	53.9 ⁴	21.86 ¹²	78.0 ²⁷
30.5	12.71 ⁵	26.8 ²⁷	33.31 ¹⁰	68.7 ³	53.91 ¹⁰	54.1 ²	21.92 ⁶	80.8 ²⁸
10.5	12.71 ⁰	29.5 ²⁷	33.37 ⁶	68.9 ²	53.98 ⁷	54.1 ⁰	21.92 ⁰	83.6 ²⁸
20.4	12.67 ⁴	32.1 ²⁶	33.41 ⁴	68.9 ⁰	54.02 ⁴	54.0 ¹	21.87 ⁵	86.4 ²⁸
8		24	1	1	1	1	9	25
30.4	12.59	34.5	33.42	68.8	54.03	53.9	21.78	88.9
ne 9.4	12.48 ¹¹	36.6 ²¹	33.41 ¹	68.6 ²	54.02 ¹	53.6 ³	21.64 ¹⁴	91.2 ²³
19.4	12.33 ¹⁵	38.5 ¹⁹	33.37 ⁴	68.3 ³	53.98 ⁴	53.3 ³	21.46 ¹⁸	93.2 ²⁰
29.3	12.15 ¹⁸	40.0 ¹⁵	33.31 ⁶	68.0 ³	53.93 ⁵	52.9 ⁴	21.25 ²¹	94.7 ¹⁵
dy 9.3	11.95 ²²	41.0 ⁷	33.23 ¹⁰	67.6 ⁴	53.85 ¹⁰	52.4 ⁵	21.01 ²⁶	95.9 ¹²
19.3	11.73	41.7	33.13	67.1	53.75	51.9	20.75	96.6
29.2	11.51 ²²	41.8 ¹	33.01 ¹²	66.6 ⁵	53.64 ¹¹	51.4 ⁵	20.48 ²⁷	96.8 ²
18.2	11.27 ²⁴	41.6 ²	32.89 ¹²	66.0 ⁶	53.52 ¹²	50.9 ⁵	20.20 ²⁸	96.5 ³
ug. 8.2	11.04 ²³	40.9 ⁷	32.76 ¹³	65.5 ⁵	53.39 ¹³	50.4 ⁵	19.92 ²⁸	95.7 ⁸
28.2	10.82 ²²	39.7 ¹²	32.64 ¹²	64.9 ⁶	53.27 ¹²	49.9 ⁵	19.65 ²⁷	94.5 ¹²
21		16	11	5	12	5	25	17
pt. 7.1	10.61	38.1	32.53	64.4	53.15	49.4	19.40	92.8
17.1	10.44 ¹⁷	36.2 ¹⁹	32.44 ⁹	63.9 ⁵	53.06 ⁹	49.0 ⁴	19.17 ²³	90.7 ²¹
27.1	10.29 ¹⁵	33.8 ²⁴	32.37 ⁷	63.6 ³	52.99 ⁷	48.7 ³	18.98 ¹⁹	88.2 ²⁵
t. 7.1	10.19 ¹⁰	31.0 ²⁸	32.34 ³	63.4 ²	52.95 ⁴	48.6 ¹	18.84 ¹⁴	85.3 ²⁹
17.0	10.13 ⁶	28.0 ³⁰	32.34 ⁰	63.4 ⁰	52.95 ⁰	48.7 ¹	18.76 ⁸	82.2 ³¹
0		32	6	1	5	3	3	34
27.0	10.13	24.8	32.40	63.5	53.00	49.0	18.73	78.8
iv. 6.0	10.20 ⁷	21.3 ³⁵	32.50 ¹⁰	63.9 ⁴	53.09 ⁹	49.4 ⁴	18.77 ⁴	75.2 ³⁶
15.9	10.32 ¹²	17.8 ³⁵	32.65 ¹⁵	64.6 ⁷	53.24 ¹⁵	50.2 ⁸	18.88 ¹¹	71.5 ³⁷
25.9	10.51 ¹⁹	14.3 ³⁵	32.85 ²⁰	65.5 ⁹	53.43 ¹⁹	51.2 ¹⁰	19.06 ¹⁸	67.8 ³⁷
xc. 5.9	10.76 ²⁵	10.8 ³⁵	33.10 ²⁸	66.6 ¹⁴	53.67 ²⁸	52.4 ¹⁵	19.31 ³¹	64.2 ³⁶
30		32	14	14	28	15	31	34
15.9	11.06	7.6	33.38	68.0	53.95	53.9	19.62	60.8
25.8	11.41 ³⁵	4.6 ³⁰	33.69 ³¹	69.6 ¹⁶	54.26 ³¹	55.5 ¹⁶	19.98 ³⁶	57.8 ³⁰
35.8	11.80 ³⁹	2.0 ²⁶	34.02 ³³	71.3 ¹⁷	54.59 ³³	57.3	20.39 ⁴¹	55.1 ²⁷
δ , Tan δ	1.452	+1.053	1.026	-0.231	1.020	-0.200	1.633	+1.291
n Place	9°.239	41°.47	30°.430	49°.37	51°.030	34°.81	18°.243	95°.61
α , D ₀ α	-0.02	+0.06	0.00	-0.01	0.00	-0.01	-0.02	+0.07
δ , D ₀ δ	-0.3	-0.5	-0.3	-0.6	-0.3	-0.6	-0.3	-0.6

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	β Boötis. Mag. 5.4		ϕ Virginis. Mag. 5.0		ϵ Ursæ Minoris. Mag. 4.4		ρ Boötis. Mag. 3.8	
	Right Ascension.	Declination N.	Right Ascension.	Declination S.	Right Ascension.	Declination N.	Right Ascension.	Declination N.
	h m 14 22	° ' + 19 35	h m 14 23	° ' - 1 50	h m 14 27	° ' + 76 3	h m 14 28	° ' + 30 44
	s 14 22	" + 19 35	s 14 23	" - 1 50	s 14 27	" + 76 3	s 14 28	" + 30 44
Jan. 0.8	30.13	76.0	49.22	58.8	40.22	60.9	10.00	20.7
10.8	30.46 ³³	73.6 ²⁴	49.55 ³³	60.8 ²⁰	41.09 ⁸⁷	58.8 ²¹	10.34 ³⁴	18.3 ²⁴
20.8	30.80 ³⁴	71.6 ²⁰	49.88 ³³	62.7 ¹⁹	42.03 ⁹⁴	57.3 ¹⁵	10.70 ³⁶	16.2 ²¹
30.7	31.14 ³⁴	69.9 ¹⁷	50.21 ³³	64.5 ¹⁸	43.01 ⁹⁸	56.5 ⁸	11.05 ³⁵	14.6 ¹⁶
Feb. 9.7	31.47 ³³	68.6 ¹³	50.53 ³²	66.1 ¹⁶	43.98 ⁹⁷	56.3 ²	11.40 ³⁵	13.5 ¹¹
	30	8	30	14	93	5	33	5
19.7	31.77	67.8	50.83	67.5	44.91	56.8	11.73	13.0
Mar. 1.7	32.06 ²⁹	67.4 ⁴	51.11 ²⁸	68.6 ¹¹	45.76 ⁸⁵	58.0 ¹²	12.03 ³⁰	12.9 ¹
11.6	32.31 ²⁵	67.5 ⁴	51.36 ²⁵	69.4 ⁸	46.52 ⁷⁶	59.7 ¹⁷	12.30 ²⁷	13.4 ⁵
21.6	32.53 ²²	67.9 ⁴	51.57 ²¹	69.9 ⁵	47.16 ⁶⁴	61.9 ²²	12.54 ²⁴	14.4 ¹⁰
31.6	32.71 ¹⁸	68.8 ⁹	51.76 ¹⁹	70.2 ³	47.65 ⁴⁹	64.6 ²⁷	12.74 ²⁰	15.7 ¹³
	15	12	15	0	34	29	15	17
Apr. 10.6	32.86	70.0	51.91	70.2	47.99	67.5	12.89	17.4
20.5	32.98 ¹²	71.4 ¹⁴	52.04 ¹³	70.0 ²	48.17 ¹⁸	70.6 ³¹	13.01 ¹²	19.4 ²⁰
30.5	33.06 ⁸	72.9 ¹⁵	52.14 ¹⁰	69.6 ⁴	48.19 ²	73.8 ³²	13.10 ⁹	21.5 ²¹
May 10.5	33.11 ⁵	74.6 ¹⁷	52.20 ⁶	69.1 ⁵	48.05 ¹⁴	76.9 ³¹	13.14 ⁴	23.6 ²¹
20.4	33.13 ²	76.3 ¹⁷	52.24 ⁴	68.5 ⁶	47.77 ²⁸	79.8 ²⁹	13.15 ¹	25.8 ²²
	1	17	2	7	42	27	2	21
30.4	33.12	78.0	52.26	67.8	47.35	82.5	13.13	27.9
June 9.4	33.09 ³	79.5 ¹⁵	52.25 ¹	67.1 ⁷	46.81 ⁵⁴	84.8 ²³	13.08 ⁵	29.9 ²⁰
19.4	33.03 ⁶	81.0 ¹⁵	52.21 ⁴	66.4 ⁷	46.17 ⁶⁴	86.7 ¹⁹	13.00 ⁸	31.6 ¹⁷
29.3	32.95 ¹⁰	82.2 ¹²	52.15 ⁸	65.7 ⁷	45.44 ⁷³	88.2 ¹⁵	12.90 ¹⁰	33.1 ¹⁵
July 9.3	32.85 ¹²	83.2 ¹⁰	52.07 ⁹	65.0 ⁶	44.65 ⁷⁹	89.1 ⁹	12.77 ¹³	34.3 ¹²
		9			84	5	14	9
19.3	32.73	84.1	51.98	64.4	43.81	89.6	12.63	35.2
29.2	32.60 ¹³	84.6 ⁵	51.87 ¹¹	63.8 ⁶	42.94 ⁸⁷	89.5 ¹	12.47 ¹⁶	35.7 ⁵
Aug. 8.2	32.46 ¹⁴	84.8 ²	51.75 ¹²	63.3 ⁵	42.07 ⁸⁷	88.8 ⁷	12.30 ¹⁷	35.8 ¹
18.2	32.32 ¹⁴	84.8 ⁰	51.62 ¹³	63.0 ³	41.21 ⁸⁶	87.6 ¹²	12.13 ¹⁷	35.6 ²
28.2	32.18 ¹⁴	84.5 ³	51.50 ¹²	62.7 ³	40.38 ⁸³	86.0 ¹⁶	11.96 ¹⁷	35.0 ⁶
		6			78	22	16	9
Sept. 7.1	32.04	83.9	51.38	62.6	39.60	83.8	11.80	34.1
17.1	31.93 ¹¹	83.0 ⁹	51.28 ¹⁰	62.6 ⁰	38.90 ⁷⁰	81.3 ²⁵	11.66 ¹⁴	32.8 ¹³
27.1	31.84 ⁹	81.8 ¹²	51.21 ⁷	62.8 ²	38.29 ⁶¹	78.3 ³⁰	11.55 ¹¹	31.1 ¹⁷
Oct. 7.1	31.78 ⁶	80.3 ¹⁵	51.16 ⁵	63.1 ³	37.79 ⁵⁰	75.0 ³³	11.47 ⁸	29.1 ²⁰
17.0	31.76 ²	78.5 ¹⁸	51.16 ⁰	63.7 ⁶	37.42 ³⁷	71.4 ³⁶	11.43 ⁴	26.7 ²⁴
		21	3	9	23	37	1	25
27.0	31.78	76.4	51.19	64.6	37.19	67.7	11.44	24.2
Nov. 6.0	31.86 ⁸	74.1 ²³	51.28 ⁹	65.6 ¹⁰	37.12 ⁷	63.8 ³⁹	11.50 ⁶	21.4 ²⁸
15.9	31.98 ¹²	71.6 ²⁵	51.42 ¹⁴	66.9 ¹³	37.20 ⁸	60.0 ³⁸	11.60 ¹⁰	18.4 ³⁰
25.9	32.15 ¹⁷	69.0 ²⁶	51.60 ¹⁸	68.4 ¹⁵	37.45 ²⁵	56.2 ³⁸	11.77 ¹⁷	15.3 ³¹
Dec. 5.9	32.37 ²²	66.3 ²⁷	51.82 ²²	70.2 ¹⁸	37.86 ⁴¹	52.6 ³⁶	11.99 ²²	12.2 ³¹
	27	27	27	18	57	34	26	30
15.9	32.64	63.6	52.09	72.0	38.43	49.2	12.25	9.2
25.8	32.93 ²⁹	61.0 ²⁶	52.38 ²⁹	74.0 ²⁰	39.13 ⁷⁰	46.3 ²⁹	12.55 ³⁰	6.3 ²⁹
35.8	33.25 ³²	58.5 ²⁵	52.70 ³²	76.0 ²⁰	39.94 ⁸¹	43.9 ²⁴	12.88 ³³	3.7 ²⁶
Sec δ , Tan δ	1.062	+0.356	1.001	-0.032	4.153	+4.031	1.163	+0.595
Mean Place	30°.123	90''.67	49°.280	50''.69	41°.302	86''.15	10°.035	38''.50
$D' \phi a$, $D_{\omega} a$	-0.01	+0.02	0.00	0.00	-0.06	+0.22	-0.01	+0.03
$D \phi \delta$, $D_{\omega} \delta$	-0.3	-0.6	-0.3	-0.6	-0.3	-0.6	-0.3	-0.6

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	γ Boötis. Mag. 3.0		η Centauri. Mag. 2.6		σ Boötis. Mag. 4.5		α^2 Centauri. Mag. 0.3	
	Right Ascension.	Declination N.	Right Ascension.	Declination S.	Right Ascension.	Declination N.	Right Ascension.	Declination S.
	h m 14 28	s +38 40	h m 14 30	s -41 47	h m 14 30	s +30 6	h m 14 33	s -60 28
Jan. 0.8	39.30	26.9	5.71	2.5	58.76	32.5	48.49	52.7
10.8	39.66 ³⁶	24.4 ²⁵	6.13 ⁴²	3.4 ⁹	59.10 ³⁴	30.0 ²⁵	49.07 ⁵⁸	53.0 ³
20.8	40.04 ³⁸	22.4 ²⁰	6.56 ⁴³	4.6 ¹²	59.45 ³⁵	27.9 ²¹	49.66 ⁵⁹	53.8 ⁸
30.7	40.42 ³⁸	20.9 ¹⁵	6.99 ⁴³	6.1 ¹⁵	59.81 ³⁶	26.3 ¹⁶	50.25 ⁵⁹	55.1 ¹³
Feb. 9.7	40.79 ³⁷	19.9 ¹⁰	7.40 ⁴¹	7.8 ¹⁷	60.15 ³⁴	25.2 ¹¹	50.82 ⁵⁷	56.7 ¹⁶
	35	3	39	19	33	6	54	20
Mar. 19.7	41.14	19.6	7.79	9.7	60.48	24.6	51.36	58.7
1.7	41.46 ³²	19.8 ²	8.15 ³⁶	11.8 ²¹	60.78 ³⁰	24.5 ¹	51.86 ⁵⁰	61.0 ²³
11.6	41.75 ²⁹	20.5 ⁷	8.48 ³³	13.9 ²¹	61.05 ²⁷	25.0 ⁵	52.31 ⁴⁵	63.5 ²⁵
21.6	42.00 ²⁵	21.8 ¹³	8.77 ²⁹	16.1 ²²	61.29 ²⁴	25.9 ⁹	52.71 ⁴⁰	66.2 ²⁷
31.6	42.21 ²¹	23.5 ¹⁷	9.02 ²⁵	18.3 ²²	61.49 ²⁰	27.2 ¹³	53.05 ³⁴	69.0 ²⁸
	16	20	22	21	16	16	28	28
Apr. 10.6	42.37	25.5	9.24	20.4	61.65	28.8	53.33	71.8
20.5	42.49 ¹²	27.8 ²³	9.41 ¹⁷	22.4 ²⁰	61.78 ¹³	30.8 ²⁰	53.55 ²²	74.6 ²⁸
30.5	42.57 ⁸	30.2 ²⁴	9.55 ¹⁴	24.4 ²⁰	61.86 ⁸	32.9 ²¹	53.71 ¹⁶	77.4 ²⁸
May 10.5	42.61 ⁴	32.7 ²⁵	9.65 ¹⁰	26.2 ¹⁸	61.91 ⁵	35.0 ²¹	53.81 ¹⁰	80.1 ²⁷
20.4	42.61 ⁰	35.1 ²⁴	9.71 ⁶	27.8 ¹⁶	61.93 ²	37.2 ²²	53.84 ³	82.6 ²⁵
	4	24	2	15	2	21	2	23
June 30.4	42.57	37.5	9.73	29.3	61.91	39.3	53.82	84.9
9.4	42.50 ⁷	39.6 ²¹	9.72 ¹	30.5 ¹²	61.87 ⁴	41.2 ¹⁹	53.73 ⁹	86.9 ²⁰
19.4	42.39 ¹¹	41.5 ¹⁹	9.67 ⁵	31.5 ¹⁰	61.79 ⁸	43.0 ¹⁸	53.59 ¹⁴	88.6 ¹⁷
29.3	42.26 ¹³	43.1 ¹⁶	9.59 ⁸	32.3 ⁸	61.69 ¹⁰	44.5 ¹⁵	53.40 ¹⁹	90.0 ¹⁴
July 9.3	42.11 ¹⁵	44.3 ¹²	9.47 ¹²	32.8 ⁵	61.57 ¹²	45.7 ¹²	53.16 ²⁴	91.0 ¹⁰
	17	9	14	2	14	9	28	6
19.3	41.94	45.2	9.33	33.0	61.43	46.6	52.88	91.6
29.3	41.75 ¹⁹	45.6 ⁴	9.16 ¹⁷	32.9 ¹	61.27 ¹⁶	47.1 ⁵	52.58 ³⁰	91.8 ²
Aug. 8.2	41.55 ²⁰	45.7 ¹	8.98 ¹⁸	32.5 ⁴	61.11 ¹⁶	47.3 ²	52.25 ³³	91.5 ³
18.2	41.35 ²⁰	45.3 ⁴	8.80 ¹⁸	31.8 ⁷	60.94 ¹⁷	47.1 ²	51.92 ³³	90.8 ⁷
28.2	41.16 ¹⁹	44.5 ⁸	8.62 ¹⁸	30.8 ¹⁰	60.77 ¹⁷	46.6 ⁵	51.60 ³²	89.7 ¹¹
	19	12	17	12	16	9	29	15
Sept. 7.1	40.97	43.3	8.45	29.6	60.61	45.7	51.31	88.2
17.1	40.81 ¹⁶	41.7 ¹⁶	8.30 ¹⁵	28.2 ¹⁴	60.47 ¹⁴	44.4 ¹³	51.05 ²⁶	86.3 ¹⁹
27.1	40.67 ¹⁴	39.7 ²⁰	8.19 ¹¹	26.7 ¹⁵	60.36 ¹¹	42.8 ¹⁶	50.85 ²⁰	84.2 ²¹
Oct. 7.1	40.57 ¹⁰	37.4 ²³	8.12 ⁷	25.1 ¹⁶	60.28 ⁸	40.8 ²⁰	50.72 ¹³	81.9 ²³
17.0	40.52 ⁵	34.7 ²⁷	8.10 ²	23.5 ¹⁶	60.23 ⁵	38.5 ²³	50.66 ⁶	79.5 ²⁴
	1	29	4	15	1	25	4	23
Nov. 27.0	40.51	31.8	8.14	22.0	60.24	36.0	50.70	77.2
6.0	40.56 ⁵	28.7 ³¹	8.25 ¹¹	20.6 ¹⁴	60.29 ⁵	33.2 ²⁸	50.83 ¹³	74.9 ²³
16.0	40.67 ¹¹	25.4 ³³	8.42 ¹⁷	19.5 ¹¹	60.40 ¹¹	30.3 ²⁹	51.06 ²³	72.8 ²¹
25.9	40.83 ¹⁶	22.1 ³³	8.66 ²⁴	18.6 ⁹	60.56 ¹⁶	27.2 ³¹	51.37 ³¹	71.0 ¹⁸
Dec. 5.9	41.05 ²²	18.8 ³³	8.95 ²⁹	18.1 ⁵	60.78 ²²	24.1 ³¹	51.77 ⁴⁰	69.6 ¹⁴
	27	32	34	1	26	30	47	10
15.9	41.32	15.6	9.29	18.0	61.04	21.1	52.24	68.6
25.8	41.63 ³¹	12.6 ³⁰	9.67 ³⁸	18.2 ²	61.33 ²⁹	18.3 ²⁸	52.76 ⁵²	68.2 ⁴
35.8	41.98 ³⁵	9.9 ²⁷	10.08 ⁴¹	18.9 ⁷	61.66 ³³	15.6 ²⁷	53.33 ⁵⁷	68.1 ¹
Sec δ , Tan δ	1.281	+0.800	1.341	-0.894	1.156	+0.580	2.030	-1.767
Mean Place	39°.366	46''.56	6°.229	6''.06	58°.810	50''.05	48°.941	66''.76
D' ϕ α , D ω α	-0.01	+0.04	+0.01	-0.05	-0.01	+0.03	+0.03	-0.03
D ϕ δ , D ω δ	-0.3	-0.6	-0.3	-0.6	-0.3	-0.6	-0.3	-0.6

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	33 Boötis. Mag. 5.4		α Apodis. Mag. 3.8		μ Virginis. Mag. 4.0		ϵ Boötis. Mag. 2.7	
	Right Ascension.	Declination N.	Right Ascension.	Declination S.	Right Ascension.	Declination S.	Right Ascension.	Declination N.
	h m	° '	h m	° '	h m	° '	h m	° '
	14 35	+44 45	14 37	-78 40	14 38	- 5 17	14 41	+27 25
	s	"	s	"	s	"	s	"
Jan. 0.8	40.34	53.9	10.33	56.8	34.58	28.5	16.37	38.3
10.8	40.72 ³⁸	51.4 ²⁵	11.64 ¹³¹	56.5 ³	34.90 ³²	30.4 ¹⁹	16.70 ³³	35.8 ²⁵
20.8	41.11 ³⁹	49.3 ²¹	13.00 ¹³⁶	56.7 ²	35.24 ³⁴	32.3 ¹⁹	17.05 ³⁵	33.7 ²¹
30.7	41.52 ⁴¹	47.8 ¹⁵	14.37 ¹³⁷	57.4 ⁷	35.57 ³³	34.1 ¹⁸	17.40 ³⁵	32.0 ¹⁷
Feb. 9.7	41.91 ³⁹	46.9 ⁹	15.72 ¹³⁵	58.7 ¹³	35.89 ³²	35.7 ¹⁶	17.74 ³⁴	30.7 ¹³
	38	2	129	17	31	14	32	7
19.7	42.29	46.7	17.01	60.4	36.20	37.1	18.06	30.0
Mar. 1.7	42.64 ³⁵	47.0 ³	18.21 ¹²⁰	62.6 ²²	36.49 ²⁹	38.3 ¹²	18.36 ³⁰	29.8 ²
11.6	42.96 ³²	47.9 ⁹	19.32 ¹¹¹	65.2 ²⁶	36.75 ²³	39.2 ⁹	18.64 ²⁸	30.1 ³
21.6	43.23 ²⁷	49.3 ¹⁴	20.31 ⁹⁹	68.0 ²⁸	36.98 ²⁶	39.9 ⁷	18.88 ²⁴	30.8 ⁷
31.6	43.46 ²³	51.2 ¹⁹	21.16 ⁸⁵	71.1 ³¹	37.18 ²⁰	40.3 ⁴	19.09 ²¹	32.0 ¹²
	18	22	70	33	17	2	17	15
Apr. 10.6	43.64	53.4	21.86	74.4	37.35	40.5	19.26	33.5
20.5	43.77 ¹³	55.9 ²⁵	22.41 ⁵⁵	77.8 ³⁴	37.50 ¹⁵	40.5 ⁰	19.39 ¹³	35.3 ¹⁸
30.5	43.85 ⁸	58.6 ²⁷	22.79 ³⁸	81.2 ³⁴	37.61 ¹¹	40.3 ²	19.49 ¹⁰	37.3 ²⁰
May 10.5	43.88 ³	61.3 ²⁷	23.01 ²²	84.6 ³⁴	37.69 ⁸	39.9 ⁴	19.55 ⁶	39.4 ²¹
20.4	43.88 ⁰	63.9 ²⁶	23.06 ⁵	87.8 ³²	37.75 ⁶	39.5 ⁴	19.58 ³	41.5 ²⁰
	5	25	11	31	3	5	0	21
30.4	43.83	66.4	22.95	90.9	37.78	39.0	19.58	43.5
June 9.4	43.74 ⁹	68.7 ²³	22.68 ²⁷	93.7 ²⁸	37.78 ⁰	38.4 ⁶	19.54 ⁴	45.4 ¹⁹
19.4	43.62 ¹²	70.8 ²¹	22.25 ⁴³	96.2 ²⁵	37.76 ²	37.8 ⁶	19.48 ⁶	47.2 ¹⁸
29.3	43.46 ¹⁶	72.5 ¹⁷	21.69 ⁵⁶	98.3 ²¹	37.71 ⁵	37.2 ⁶	19.39 ⁹	48.7 ¹⁵
July 9.3	43.28 ²⁰	73.8 ¹³	21.00 ⁶⁹	100.0 ¹⁷	37.64 ⁷	36.6 ⁶	19.28 ¹¹	50.0 ¹³
		9	79	12	9	6	13	10
19.3	43.08	74.7	20.21	101.2	37.55	36.0	19.15	51.0
29.3	42.86 ²²	75.1 ⁴	19.35 ⁸⁶	101.9 ⁷	37.44 ¹¹	35.5 ⁵	19.00 ¹⁵	51.6 ⁶
Aug. 8.2	42.63 ²³	75.2 ¹	18.44 ⁹¹	102.0 ¹	37.32 ¹²	35.0 ⁵	18.84 ¹⁶	51.9 ³
18.2	42.40 ²³	74.7 ⁵	17.51 ⁹³	101.6 ⁴	37.19 ¹³	34.6 ⁵	18.68 ¹⁶	51.8 ¹
28.2	42.17 ²³	73.8 ⁹	16.61 ⁹⁰	100.7 ⁹	37.06 ¹³	34.2 ⁴	18.51 ¹⁷	51.4 ⁴
	22	13	83	15	12	2	16	7
Sept. 7.1	41.95	72.5	15.78	99.2	36.94	34.0	18.35	50.7
17.1	41.75 ²⁰	70.8 ¹⁷	15.04 ⁷⁴	97.3 ¹⁹	36.83 ¹¹	33.9 ¹	18.21 ¹⁴	49.6 ¹¹
27.1	41.58 ¹⁷	68.6 ²²	14.44 ⁶⁰	95.0 ²³	36.74 ⁹	33.9 ⁰	18.09 ¹²	48.1 ¹⁵
Oct. 7.1	41.46 ¹²	66.1 ²⁵	14.00 ⁴⁴	92.4 ²⁶	36.69 ⁵	34.1 ²	18.00 ⁹	46.3 ¹⁸
17.0	41.38 ⁸	63.2 ²⁹	13.76 ²⁴	89.5 ²⁹	36.67 ²	34.5 ⁴	17.95 ⁵	44.2 ²¹
	3	31	3	29	2	6	1	24
27.0	41.35	60.1	13.73	86.6	36.69	35.1	17.94	41.8
Nov. 6.0	41.38 ³	56.8 ³³	13.92 ¹⁹	83.6 ³⁰	36.77 ⁸	35.9 ⁸	17.99 ⁵	39.2 ²⁶
16.0	41.48 ¹⁰	53.3 ³⁵	14.34 ⁴²	80.8 ²⁸	36.89 ¹²	37.0 ¹¹	18.09 ¹⁰	36.4 ²⁸
25.9	41.63 ¹⁵	49.8 ³⁵	14.98 ⁶⁴	78.3 ²⁵	37.06 ¹⁷	38.3 ¹³	18.24 ¹⁵	33.4 ³⁰
Dec. 5.9	41.85 ²⁷	46.3 ³⁵	15.82 ⁸⁴	76.1 ²²	37.28 ²²	39.8 ¹⁵	18.44 ²⁰	30.4 ³⁰
	22	33	101	18	26	16	25	29
15.9	42.12	43.0	16.83	74.3	37.54	41.4	18.69	27.5
25.8	42.44 ³²	39.9 ³¹	17.98 ¹¹⁵	73.0 ¹³	37.83 ²⁹	43.2 ¹⁸	18.97 ²⁸	24.7 ²⁸
35.8	42.80 ³⁶	37.1 ²¹	19.25 ¹²⁷	72.2 ⁸	38.14 ³¹	45.1 ¹⁹	19.29 ³²	22.0 ²⁷
Sec δ , Tan δ	1.408	+0.992	5.098	-4.999	1.004	-0.093	1.127	+0.519
Mean Place	40°.501	74°.81	14°.370	66°.42	34°.732	21°.29	16°.494	55°.12
$D'\phi\alpha$, $D\omega\alpha$	-0.02	+0.05	+0.08	-0.26	0.00	0.00	-0.01	+0.03
$D'\phi\delta$, $D\omega\delta$	-0.3	-0.6	-0.3	-0.6	-0.3	-0.6	-0.3	-0.6

FOR THE UPPER TRANSIT AT WASHINGTON.

an Solar Date.	109 Virginis. Mag. 3.8		8 Libræ. Mag. 5.3		α Libræ. Mag. 2.9		Groombridge 2164. Mag. 5.7	
	Right Ascension.	Declina- tion N.	Right Ascension.	Declina- tion S.	Right Ascension.	Declina- tion S.	Right Ascension.	Declina- tion N.
	h m 14 41	° ' " + 2 14	h m 14 45	° ' " - 15 38	h m 14 46	° ' " - 15 41	h m 14 49	° ' " + 59 37
	s 56.88	" 52.1	s 58.68	" 44.2	s 10.13	" 25.3	s 16.31	" 57.5
1. 0.8	57.20 ³²	50.0 ²¹	59.02 ³⁴	45.7 ¹⁵	10.46 ³³	26.9 ¹⁶	16.77 ⁴⁶	54.9 ²⁶
10.8	57.53 ³³	48.1 ¹⁹	59.36 ³⁴	47.4 ¹⁷	10.81 ³⁵	28.5 ¹⁶	17.27 ⁵⁰	52.9 ²⁰
20.8	57.86 ³³	46.3 ¹⁸	59.71 ³⁵	49.0 ¹⁶	11.15 ³⁴	30.2 ¹⁷	17.78 ⁵¹	51.5 ¹⁴
30.8	58.18 ³²	44.8 ¹⁵	60.04 ³³	50.7 ¹⁷	11.49 ³⁴	31.8 ¹⁶	18.29 ⁵¹	50.8 ⁷
4. 9.7	58.18 ³¹	44.8 ¹³	60.04 ³²	50.7 ¹⁵	11.49 ³²	31.8 ¹⁶	18.29 ⁵⁰	50.8 ¹
19.7	58.49 ²⁸	43.5 ¹⁰	60.36 ³⁰	52.2 ¹⁴	11.81 ³⁰	33.4 ¹⁴	18.79 ⁴⁷	50.7 ⁶
7. 1.7	58.77 ²⁶	42.5 ⁶	60.66 ²⁸	53.6 ¹³	12.11 ²⁷	34.8 ¹²	19.26 ⁴²	51.3 ¹²
11.6	59.03 ²³	41.9 ³	60.94 ²⁴	54.9 ¹¹	12.38 ²⁵	36.0 ¹¹	19.68 ³⁷	52.5 ¹⁷
21.6	59.26 ²⁰	41.6 ⁰	61.18 ²²	56.0 ⁹	12.63 ²¹	37.1 ⁸	20.05 ³⁰	54.2 ²²
31.6	59.46 ¹⁷	41.6 ²	61.40 ¹⁸	56.9 ⁷	12.84 ¹⁹	38.0 ⁸	20.35 ²⁴	56.4 ²⁶
8. 10.6	59.63 ¹⁴	41.8 ⁵	61.58 ¹⁶	57.6 ⁵	13.03 ¹⁶	38.8 ⁵	20.59 ¹⁷	59.0 ²⁹
20.5	59.77 ¹¹	42.3 ⁶	61.74 ¹³	58.1 ⁴	13.19 ¹³	39.3 ⁴	20.76 ¹⁰	61.9 ³⁰
30.5	59.88 ⁹	42.9 ⁸	61.87 ¹⁰	58.5 ³	13.32 ⁹	39.7 ³	20.86 ²	64.9 ³¹
9. 10.5	59.97 ⁵	43.7 ⁹	61.97 ⁷	58.8 ¹	13.41 ⁴	40.0 ⁰	20.88 ¹⁰	68.0 ²⁸
20.5	60.02 ³	44.6 ⁹	62.04 ⁴	58.9 ⁰	13.48 ⁷	40.1 ⁰	20.84 ⁴	71.0 ³⁰
30.4	60.05 ⁰	45.5 ¹⁰	62.08 ¹	58.9 ⁰	13.52 ²	40.1 ⁰	20.74 ¹⁶	73.8 ²⁶
ne 9.4	60.05 ³	46.5 ⁹	62.09 ²	58.9 ²	13.54 ²	40.1 ²	20.58 ²²	76.4 ²³
19.4	60.02 ⁵	47.4 ⁹	62.07 ⁴	58.7 ²	13.52 ⁴	39.9 ²	20.36 ²⁶	78.7 ¹⁹
29.3	59.97 ¹⁰	48.3 ⁸	62.03 ⁷	58.5 ⁴	13.48 ⁷	39.7 ⁴	20.10 ³⁴	80.6 ¹⁴
ly 9.3	59.90 ⁷	49.1 ⁷	61.96 ⁹	58.2 ⁴	13.41 ⁹	39.4 ⁴	19.80 ³⁴	82.0 ⁹
19.3	59.80 ¹¹	49.8 ⁶	61.87 ¹¹	57.8 ⁴	13.32 ¹¹	39.0 ⁴	19.46 ³⁶	82.9 ⁵
29.3	59.69 ¹²	50.4 ⁵	61.76 ¹²	57.4 ⁵	13.21 ¹³	38.6 ⁵	19.10 ³⁷	83.4 ⁰
18.2	59.57 ¹³	50.9 ³	61.64 ¹⁴	56.9 ⁵	13.08 ¹³	38.1 ⁵	18.73 ³⁷	83.4 ⁶
28.2	59.44 ¹³	51.2 ²	61.50 ¹⁴	56.4 ⁵	12.95 ¹⁴	37.6 ⁵	18.36 ³⁷	82.8 ¹⁰
38.2	59.31 ¹³	51.4 ⁰	61.36 ¹³	55.9 ⁵	12.81 ¹³	37.1 ⁵	17.99 ³⁶	81.8 ¹⁶
48.2	59.18 ¹¹	51.4 ¹	61.23 ¹¹	55.4 ⁵	12.68 ¹²	36.6 ⁵	17.63 ³³	80.2 ²⁰
58.2	59.07 ⁹	51.3 ⁴	61.12 ¹⁰	54.9 ⁵	12.56 ⁹	36.1 ⁵	17.30 ²⁸	78.2 ²⁵
68.2	58.98 ⁷	50.9 ⁶	61.02 ⁶	54.4 ³	12.47 ⁶	35.6 ³	17.02 ²⁴	75.7 ²⁸
78.2	58.91 ²	50.3 ⁸	60.96 ²	54.1 ²	12.41 ³	35.3 ¹	16.78 ¹⁸	72.9 ³¹
88.2	58.89 ²	49.5 ¹⁰	60.94 ²	53.9 ¹	12.38 ³	35.1 ¹	16.60 ¹¹	69.8 ³⁵
98.2	58.91 ⁶	48.5 ¹³	60.96 ⁷	53.8 ²	12.41 ⁷	35.0 ²	16.49 ³	66.3 ³⁶
108.2	58.97 ¹¹	47.2 ¹⁵	61.03 ¹²	54.0 ⁴	12.48 ¹²	35.2 ⁴	16.46 ⁵	62.7 ³⁸
118.2	59.08 ¹⁷	45.7 ¹⁸	61.15 ¹⁸	54.4 ⁶	12.60 ¹⁷	35.6 ⁶	16.51 ¹⁴	58.9 ³⁸
128.2	59.25 ²¹	44.0 ¹⁷	61.33 ²²	55.0 ⁹	12.77 ²²	36.2 ⁹	16.65 ²²	55.1 ³⁷
138.2	59.46 ²⁴	42.2 ²⁰	61.55 ²⁶	55.9 ¹¹	12.99 ²⁷	37.1 ¹¹	16.87 ³⁰	51.4 ³⁵
148.2	59.70 ²⁸	40.2 ²¹	61.81 ³⁰	57.0 ¹³	13.26 ³⁰	38.2 ¹³	17.17 ³⁷	47.9 ³²
158.2	59.98 ³¹	38.1 ²¹	62.11 ³³	58.3 ¹⁵	13.56 ³²	39.5 ¹⁵	17.54 ⁴³	44.7 ²⁹
168.2	60.29 ³¹	36.0 ²¹	62.44 ³³	59.8 ¹⁵	13.88 ³²	41.0 ¹⁵	17.97 ⁴³	41.8 ²⁹
$\alpha \delta$, Tan δ an Place	1.001 57°.024	+0.039 61''.72	1.038 58°.934	-0.280 39''.87	1.039 10°.380	-0.281 21''.05	1.978 16°.884	+1.707 80''.62
$\mu \alpha$, $D_{\mu} \alpha$ $\mu \delta$, $D_{\mu} \delta$	0.00 -0.3	0.00 -0.6	0.00 -0.3	-0.01 -0.7	0.00 -0.3	-0.01 -0.7	-0.03 -0.3	+0.08 -0.7

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	β Ursæ Minoris. Mag. 2.2		ξ^2 Libræ. Mag. 5.6		Piazzi 221. Mag. 5.8		β Lupi. Mag. 2.8	
	Right Ascension.	Declination N.	Right Ascension.	Declination S.	Right Ascension.	Declination N.	Right Ascension.	Declination S.
	h m	° '	h m	° '	h m	° '	h m	° '
	14 50	+74 29	14 52	-11 4	14 52	+14 46	14 52	-42 47
Jan. 0.8	54.92 ^s	45.8 ["]	8.93 ^s	8.0 ["]	12.26 ^s	67.8 ["]	56.70 ^s	29.9 ["]
10.8	55.67 ⁷⁵	43.4 ²⁴	9.26 ³³	9.7 ¹⁷	12.58 ³²	65.5 ²³	57.12 ⁴²	30.5 ⁶
20.8	56.49 ⁸²	41.6 ¹⁸	9.59 ³³	11.4 ¹⁷	12.90 ³²	63.4 ²¹	57.55 ⁴³	31.4 ⁹
30.8	57.36 ⁸⁷	40.4 ¹²	9.93 ³⁴	13.1 ¹⁷	13.23 ³³	61.6 ¹⁸	57.98 ⁴³	32.7 ¹³
Feb. 9.7	58.24 ⁸⁷	39.9 ⁵	10.26 ³³	14.7 ¹⁶	13.56 ³³	60.1 ¹⁵	58.41 ⁴³	34.2 ¹⁵
19.7	59.11 ⁸¹	40.1 ⁹	10.58 ³²	16.1 ¹⁴	13.87 ³¹	59.1 ¹⁰	58.82 ⁴¹	35.8 ¹⁶
Mar. 1.7	59.92 ⁷³	41.0 ⁹	10.88 ³⁰	17.4 ¹³	14.16 ²⁹	58.5 ⁶	59.20 ³⁸	37.7 ¹⁹
11.7	60.65 ⁸³	42.4 ¹⁴	11.15 ²⁷	18.5 ¹¹	14.43 ²⁷	58.3 ²	59.55 ³⁵	39.6 ¹⁹
21.6	61.28 ⁶³	44.4 ²⁰	11.39 ²⁴	19.3 ⁸	14.67 ²⁴	58.5 ²	59.87 ³²	41.6 ²⁰
31.6	61.80 ⁵²	46.9 ²⁵	11.61 ²²	20.0 ⁷	14.88 ²¹	59.1 ⁶	60.15 ²⁸	43.7 ²¹
Apr. 10.6	62.19 ³⁹	49.7 ²⁸	11.80 ¹⁹	20.4 ⁴	15.05 ¹⁷	60.0 ⁹	60.40 ²⁵	45.7 ²⁰
20.5	62.43 ²⁴	52.7 ³⁰	11.96 ¹⁶	20.7 ³	15.20 ¹⁵	61.1 ¹¹	60.61 ²¹	47.7 ¹⁹
30.5	62.54 ¹¹	55.9 ³²	12.09 ¹³	20.8 ¹	15.32 ¹²	62.5 ¹⁴	60.78 ¹⁷	49.4 ¹⁸
May 10.5	62.50 ⁴	59.1 ³²	12.19 ¹⁰	20.8 ⁰	15.40 ⁸	64.0 ¹⁵	60.92 ¹⁴	51.6 ¹⁸
20.5	62.32 ¹⁸	62.1 ³⁰	12.26 ⁷	20.6 ²	15.45 ⁵	65.6 ¹⁶	61.01 ⁹	53.1 ¹⁷
30.4	62.02 ³⁰	65.0 ²⁹	12.31 ⁵	20.4 ²	15.48 ³	67.2 ¹⁶	61.06 ⁵	54.6 ¹⁵
June 9.4	61.60 ⁴²	67.5 ²⁵	12.32 ¹	20.1 ³	15.47 ¹	68.7 ¹⁵	61.07 ¹	56.0 ¹⁴
19.4	61.08 ⁵²	69.7 ²²	12.31 ¹	19.7 ⁴	15.44 ³	70.1 ¹⁴	61.04 ³	57.1 ¹¹
29.4	60.47 ⁶¹	71.5 ¹⁸	12.27 ⁴	19.3 ⁴	15.38 ⁶	71.4 ¹³	60.97 ⁷	58.0 ⁹
July 9.3	59.79 ⁶⁸	72.8 ¹³	12.21 ⁶	18.8 ⁵	15.30 ⁸	72.5 ¹¹	60.87 ¹⁰	58.7 ⁷
19.3	59.06 ⁷³	73.6 ⁸	12.12 ⁹	18.4 ⁴	15.20 ¹⁰	73.4 ⁹	60.74 ¹³	59.1 ⁴
29.3	58.28 ⁷⁸	73.8 ²	12.01 ¹¹	17.9 ⁵	15.08 ¹²	74.2 ⁸	60.58 ¹⁶	59.2 ¹
Aug. 8.2	57.49 ⁷⁹	73.6 ²	11.89 ¹²	17.4 ⁵	14.94 ¹⁴	74.6 ⁴	60.40 ¹⁸	58.9 ³
18.2	56.69 ⁸⁰	72.8 ⁸	11.76 ¹³	17.0 ⁴	14.80 ¹⁴	74.8 ²	60.21 ¹⁹	58.4 ⁵
28.2	55.91 ⁷⁸	71.5 ¹³	11.62 ¹⁴	16.5 ⁵	14.65 ¹⁵	74.8 ⁰	60.01 ²⁰	57.6 ⁸
Sept. 7.2	55.17 ⁷⁴	69.7 ¹⁸	11.49 ¹³	16.1 ⁴	14.51 ¹⁴	74.8 ³	59.82 ¹⁹	56.6 ¹⁰
17.1	54.48 ⁶⁰	67.4 ²³	11.37 ¹²	15.8 ³	14.38 ¹³	74.5 ⁶	59.65 ¹⁷	55.3 ¹³
27.1	53.86 ⁶²	64.7 ²⁷	11.28 ⁹	15.5 ³	14.27 ¹¹	73.9 ⁹	59.52 ¹³	53.9 ¹⁴
Oct. 7.1	53.34 ⁵²	61.7 ³⁰	11.21 ⁷	15.4 ¹	14.19 ⁸	73.0 ⁹	59.52 ¹⁰	52.3 ¹⁶
17.0	52.92 ⁴²	58.3 ³⁴	11.18 ³	15.4 ⁰	14.14 ⁵	71.8 ¹²	59.42 ¹⁰	53.9 ¹⁶
27.0	52.63 ²⁹	54.7 ³⁶	11.20 ²	15.6 ²	14.14 ⁰	70.4 ¹⁴	59.38 ⁴	50.7 ¹⁵
Nov. 6.0	52.48 ¹⁵	54.7 ³⁸	11.20 ⁶	15.6 ⁵	14.14 ⁰	68.7 ¹⁷	59.39 ¹	49.2 ¹⁵
16.0	52.47 ¹	50.9 ³⁹	11.26 ⁵	16.1 ⁵	14.18 ⁴	66.7 ²⁰	59.47 ⁸	47.7 ¹³
25.9	52.62 ¹⁵	47.0 ³⁹	11.37 ¹¹	16.8 ⁷	14.28 ¹⁰	64.6 ²¹	59.61 ¹⁴	46.4 ¹⁰
Dec. 5.9	52.62 ³⁰	43.2 ³⁸	11.54 ¹⁷	17.7 ⁹	14.42 ¹⁴	62.2 ²⁴	59.82 ²¹	45.4 ⁷
15.9	52.92 ⁴⁴	39.5 ³⁷	11.75 ²⁵	18.8 ¹¹	14.62 ²⁰	59.7 ²⁵	60.10 ²⁸	44.7 ³
25.9	53.36 ⁵⁷	36.0 ³⁵	12.00 ²⁵	20.1 ¹³	14.85 ²³	57.2 ²⁵	60.42 ³²	44.4 ⁴
35.8	53.93 ⁶⁹	32.9 ³¹	12.29 ²⁹	21.6 ¹⁵	15.12 ²⁷	54.7 ²⁵	60.79 ³⁷	44.3 ⁴
	54.62 ⁶⁹	30.2 ²⁷	12.60 ³¹	23.2 ¹⁶	15.43 ³¹	52.3 ²⁴	61.20 ⁴¹	44.7 ⁴
Sec δ , Tan δ	3.741	+3.605	1.019	-0.196	1.034	+0.264	1.363	-0.926
Mean Place	56°.467	70''.25	9°.179	2''.22	12°.434	81''.14	57°.352	32''.73
$D\psi\alpha$, $D\omega\alpha$	-0.06	+0.18	0.00	-0.01	0.00	+0.01	+0.02	-0.04
$D\psi\delta$, $D\omega\delta$	-0.3	-0.7	-0.3	-0.7	-0.3	-0.7	-0.3	-0.7

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	δ Libræ. Var. 4.8-6.2		β Boëtis. Mag. 3.6		γ Scorpii. Mag. 3.4		ψ Boëtis. Mag. 4.7	
	Right Ascension.	Declination S.	Right Ascension.	Declination N.	Right Ascension.	Declination S.	Right Ascension.	Declination N.
	h m 14 56	° ' — 8 10	h m 14 58	° ' + 40 42	h m 14 59	° ' — 24 56	h m 15 0	° ' + 27 16
	s 14 56	" — 8 10	s 14 58	" + 40 42	s 14 59	" — 24 56	s 15 0	" + 27 16
an. 0.8	25.44	63.1	44.33	71.4	5.11	56.6	47.94	25.9
10.8	25.76 ³²	64.8 ¹⁷	44.68 ³⁵	68.7 ²⁷	5.46 ³⁵	57.8 ¹²	48.26 ³²	23.3 ²⁶
20.8	26.09 ³³	66.5 ¹⁷	45.05 ³⁷	66.5 ²²	5.82 ³⁶	59.2 ¹⁴	48.60 ³⁴	21.1 ²²
30.8	26.43 ³⁴	68.2 ¹⁷	45.43 ³⁸	64.7 ¹⁸	6.18 ³⁶	60.6 ¹⁴	48.94 ³⁴	19.3 ¹⁸
Feb. 9.7	26.75 ³²	69.8 ¹⁶	45.81 ³⁸	63.6 ¹¹	6.54 ³⁶	62.2 ¹⁶	49.28 ³⁴	18.0 ¹³
		14		6		15		9
19.7	27.07	71.2	46.17	63.0	6.88	63.7	49.61	17.1
Mar. 1.7	27.37 ³⁰	72.4 ¹²	46.52 ³⁵	63.0 ⁰	7.20 ³²	65.2 ¹⁵	49.92 ³¹	16.8 ³
11.7	27.64 ²⁷	73.4 ¹⁰	46.84 ³²	63.6 ⁶	7.50 ³⁰	66.7 ¹⁵	50.21 ²⁹	17.0 ²
21.6	27.88 ²⁴	74.1 ⁷	47.12 ²⁸	64.8 ¹²	7.77 ²⁷	68.1 ¹⁴	50.47 ²⁶	17.7 ⁷
31.6	28.10 ²²	74.6 ⁵	47.36 ²⁴	66.4 ¹⁶	8.01 ²⁴	69.4 ¹³	50.69 ²²	18.8 ¹¹
		19		20		11		15
pr. 10.6	28.29	74.9	47.56	68.4	8.23	70.5	50.88	20.3
20.5	28.45 ¹⁶	75.0 ¹	47.72 ¹⁶	70.7 ²³	8.41 ¹⁸	71.5 ¹⁰	51.03 ¹⁵	22.0 ¹⁷
30.5	28.58 ¹³	74.9 ¹	47.83 ¹¹	73.3 ²⁶	8.56 ¹⁵	72.4 ⁹	51.15 ¹²	24.0 ²⁰
May 10.5	28.69 ¹¹	74.7 ²	47.90 ⁷	75.9 ²⁶	8.68 ¹²	73.2 ⁸	51.23 ⁸	26.1 ²¹
20.5	28.76 ⁷	74.4 ³	47.93 ³	78.5 ²⁶	8.77 ⁹	73.8 ⁶	51.28 ⁵	28.3 ²²
		5		26		6		22
30.4	28.81	74.0	47.92	81.1	8.82	74.4	51.29	30.5
June 9.4	28.83 ²	73.5 ⁵	47.87 ⁵	83.5 ²⁴	8.84 ²	74.8 ⁴	51.28 ¹	32.5 ²⁰
19.4	28.82 ¹	73.0 ⁵	47.78 ⁹	85.7 ²²	8.84 ⁰	75.1 ³	51.23 ⁵	34.4 ¹⁹
29.4	28.78 ⁴	72.4 ⁶	47.66 ¹²	87.6 ¹⁹	8.80 ⁴	75.3 ⁰	51.15 ¹⁰	36.0 ¹⁶
July 9.3	28.72 ⁹	71.9 ⁵	47.51 ¹⁵	89.1 ¹⁵	8.73 ⁷	75.3 ¹	51.05 ¹³	37.4 ¹⁴
				11				11
19.3	28.63 ¹¹	71.4 ⁵	47.33 ²⁰	90.2 ⁸	8.64 ¹²	75.2 ²	50.92 ¹⁵	38.5 ⁸
29.3	28.52 ¹²	70.9 ⁵	47.13 ²¹	91.0 ³	8.52 ¹³	75.0 ⁴	50.77 ¹⁶	39.3 ⁵
Aug. 8.2	28.40 ¹³	70.4 ⁵	46.92 ²²	91.3 ¹	8.39 ¹⁵	74.6 ⁵	50.61 ¹⁷	39.8 ¹
18.2	28.27 ¹⁴	69.9 ⁴	46.70 ²²	91.2 ⁶	8.24 ¹⁵	74.1 ⁶	50.44 ¹⁷	39.9 ³
28.2	28.13 ¹³	69.5 ³	46.48 ²¹	90.6 ¹⁰	8.09 ¹⁵	73.5 ⁷	50.27 ¹⁷	39.6 ⁶
Sept. 7.2	28.00 ¹²	69.2 ²	46.27 ²⁰	89.6 ¹⁴	7.94 ¹³	72.8 ⁸	50.10 ¹⁶	39.0 ¹⁰
17.1	27.88 ¹⁰	68.9 ¹	46.07 ¹⁸	88.2 ¹⁸	7.81 ¹¹	72.0 ⁸	49.94 ¹⁴	38.0 ¹³
27.1	27.78 ⁷	68.9 ⁰	45.89 ¹⁴	86.4 ²²	7.70 ⁷	71.2 ⁷	49.80 ¹⁰	36.7 ¹⁷
Oct. 7.1	27.71 ³	69.1 ⁴	45.65 ¹⁰	84.2 ²⁶	7.63 ⁴	70.5 ⁶	49.70 ⁷	35.0 ²⁰
17.1	27.68 ¹	69.5 ⁶	45.61 ¹	75.6 ³²	7.67 ⁷	68.7 ⁵	49.62 ²	28.2 ²⁵
Nov. 6.0	27.75 ¹⁰	70.9 ⁸	45.67 ⁶	72.4 ³²	7.78 ¹¹	68.5 ²	49.70 ⁸	25.4 ²⁸
16.0	27.85 ¹⁰	72.0 ¹¹	45.80 ¹³	69.0 ³⁴	7.96 ¹⁸	68.6 ¹	49.83 ¹³	22.5 ²⁹
Dec. 25.9	28.01 ²⁰	73.2 ¹⁵	45.98 ¹⁸	65.6 ³⁴	8.18 ²²	68.9 ³	50.01 ¹⁸	19.5 ³⁰
5.9	28.21 ²⁵							
15.9	28.46 ²⁸	74.7 ¹⁶	46.22 ²⁹	62.2 ³²	8.45 ³⁰	69.4 ⁸	50.24 ²⁷	16.5 ²⁹
25.9	28.74 ³¹	76.3 ¹⁷	46.51 ³³	59.0 ²⁸	8.75 ³⁴	70.2 ¹⁰	50.51 ³⁰	13.6 ²⁷
35.8	29.05 ³¹	78.0 ¹⁷	46.84 ³³	56.2 ²⁸	9.09 ³⁴	71.2 ¹⁰	50.81 ³⁰	10.9 ²⁷
δ , Tan δ	1.010	-0.144	1.319	+0.861	1.103	-0.465	1.125	+0.516
Mean Place	25°.691	56''.32	44°.662	91''.03	5°.502	54''.64	48°.194	42''.50
ψ α , D_{α} α	0.00	-0.01	-0.02	+0.04	+0.01	-0.02	-0.01	+0.02
ψ δ , D_{δ} δ	-0.3	-0.7	-0.3	-0.7	-0.3	-0.7	-0.3	-0.7

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	♋ Boötis. Mag. 5.0		♌ Lupi. Mag. 3.5		♎ Libræ. Mag. 4.7		♏ Triang. Aust. Mag. 3.1	
	Right Ascension.	Declination N.	Right Ascension.	Declination S.	Right Ascension.	Declination S.	Right Ascension.	Declination S.
	h m 15 3	° ' " + 25 11	h m 15 6	° ' " - 51 46	h m 15 7	° ' " - 19 28	h m 15 10	° ' " - 68 21
Jan. 0.9	33.80 ^s	42.3 ^s	9.26 ^s	30.9 ^s	21.99 ^s	18.8 ^s	55.14 ^s	53.7 ^s
10.8	34.11 ³¹	39.8 ²⁵	9.73 ⁴⁷	31.0 ¹	22.32 ³³	20.2 ¹⁴	55.86 ⁷²	53.1 ⁶
20.8	34.44 ³³	37.6 ²²	10.22 ⁴⁹	31.5 ⁵	22.67 ³⁵	21.6 ¹⁴	56.62 ⁷⁶	53.1 ⁰
30.8	34.78 ³⁴	35.7 ¹⁹	10.72 ⁵⁰	32.4 ⁹	23.02 ³⁵	23.1 ¹⁵	57.40 ⁷⁸	53.5 ⁴
Feb. 9.7	35.12 ³⁴	34.3 ¹⁴	11.21 ⁴⁹	33.6 ¹²	23.36 ³⁴	24.6 ¹⁵	58.18 ⁷⁸	54.4 ⁹
19.7	35.45 ³³	33.4 ⁹	11.69 ⁴⁸	35.1 ¹⁵	23.70 ³⁴	26.0 ¹⁴	58.94 ⁷⁶	55.8 ¹⁴
Mar. 1.7	35.76 ³¹	33.1 ³	12.15 ⁴⁶	36.9 ¹⁸	24.01 ³¹	27.4 ¹⁴	59.66 ⁷²	57.5 ¹⁷
11.7	36.04 ²⁸	33.2 ¹	12.57 ⁴²	38.8 ¹⁹	24.30 ²⁹	28.7 ¹³	60.34 ⁶⁸	59.6 ²¹
21.6	36.30 ²⁶	33.7 ⁵	12.96 ³⁹	41.0 ²²	24.57 ²⁷	29.8 ¹¹	60.96 ⁶²	61.9 ²³
31.6	36.52 ²²	34.7 ¹⁰	13.30 ³⁴	43.2 ²²	24.81 ²⁴	30.8 ¹⁰	61.52 ⁵⁶	64.5 ²⁶
Apr. 10.6	36.71 ¹⁹	36.1 ¹⁴	13.61 ³¹	45.5 ²³	25.02 ²¹	31.6 ⁸	62.01 ⁴⁹	67.3 ²⁸
20.6	36.87 ¹⁶	37.8 ¹⁷	13.87 ²⁶	47.8 ²³	25.20 ¹⁸	32.3 ⁷	62.42 ⁴¹	70.1 ³⁰
30.5	36.99 ¹²	37.9 ¹⁹	14.09 ²²	50.1 ²³	25.36 ¹⁶	32.8 ⁵	62.75 ³³	73.1 ²⁹
May 10.5	37.08 ⁹	41.7 ²⁰	14.25 ¹⁶	52.3 ²²	25.48 ¹²	33.3 ⁵	63.00 ²⁵	76.0 ²⁹
20.5	37.14 ⁶	43.8 ²¹	14.37 ¹²	54.4 ²¹	25.57 ⁹	33.6 ³	63.16 ¹⁶	78.9 ²⁷
30.4	37.16 ²	45.9 ²¹	14.44 ⁷	56.4 ²⁰	25.64 ⁷	33.8 ²	63.24 ⁸	81.6 ²⁶
June 9.4	37.15 ¹	47.9 ²⁰	14.46 ²	58.3 ¹⁹	25.67 ³	33.9 ¹	63.22 ²	84.2 ²⁶
19.4	37.11 ⁴	49.7 ¹⁸	14.43 ³	59.9 ¹⁶	25.67 ⁰	33.9 ⁰	63.12 ¹⁰	86.5 ²³
29.4	37.04 ¹⁰	51.3 ¹⁶	14.35 ⁸	61.2 ¹³	25.64 ³	33.9 ⁰	62.94 ¹⁸	88.5 ²⁰
July 9.3	36.94 ¹²	52.7 ¹⁴	14.23 ¹²	62.3 ¹¹	25.58 ⁶	33.7 ²	62.68 ²⁶	90.2 ¹⁷
19.3	36.82 ¹⁴	53.8 ⁸	14.06 ²⁰	63.0 ⁴	25.50 ¹¹	33.5 ³	62.35 ³⁹	91.5 ⁹
29.3	36.68 ¹⁵	54.6 ⁵	13.86 ²²	63.4 ⁰	25.39 ¹³	33.2 ⁴	61.96 ⁴³	92.4 ³
Aug. 8.3	36.53 ¹⁷	55.1 ¹	13.64 ²⁴	63.4 ³	25.26 ¹⁴	32.8 ⁵	61.53 ⁴⁶	92.7 ¹
18.2	36.36 ¹⁷	55.2 ²	13.40 ²⁵	63.1 ⁷	25.12 ¹⁵	32.3 ⁶	61.07 ⁴⁶	92.6 ⁶
28.2	36.19 ¹⁷	55.0 ⁵	13.15 ²⁴	62.4 ¹⁰	24.98 ¹⁵	31.8 ⁶	60.61 ⁴⁵	92.0 ¹¹
Sept. 7.2	36.02 ¹⁵	54.5 ⁹	12.91 ²²	61.4 ¹⁴	24.83 ¹³	31.2 ⁵	60.16 ⁴¹	90.9 ¹⁵
17.1	35.87 ¹³	53.6 ¹²	12.69 ¹⁹	60.0 ¹⁶	24.70 ¹¹	30.7 ⁶	59.75 ³⁵	89.4 ¹⁹
27.1	35.74 ¹¹	52.4 ¹⁶	12.50 ¹³	58.4 ¹⁸	24.59 ⁸	30.1 ⁵	59.40 ²⁷	87.5 ²²
Oct. 7.1	35.63 ⁷	50.8 ¹⁹	12.37 ⁸	56.6 ¹⁹	24.51 ⁴	29.6 ⁴	59.13 ¹⁸	85.3 ²⁴
17.1	35.56 ²	48.9 ²²	12.29 ¹	54.7 ²⁰	24.47 ⁰	29.2 ³	58.95 ⁷	82.9 ²⁶
27.0	35.54 ²	46.7 ²⁵	12.28 ⁶	52.7 ¹⁹	24.47 ⁵	28.9 ¹	58.88 ⁵	80.3 ²⁶
Nov. 6.0	35.56 ⁷	44.2 ²⁶	12.34 ¹⁴	50.8 ¹⁸	24.52 ¹⁰	28.8 ¹	58.93 ¹⁸	77.7 ²⁶
16.0	35.63 ¹³	41.6 ²⁹	12.48 ²²	49.0 ¹⁵	24.62 ¹⁶	28.9 ³	59.11 ³⁰	75.1 ²⁴
26.0	35.76 ¹⁸	38.7 ²⁹	12.70 ²⁹	47.5 ¹³	24.78 ²¹	29.2 ⁶	59.41 ⁴²	72.7 ²¹
Dec. 5.9	35.94 ²³	35.8 ²⁹	12.99 ³⁶	46.2 ¹⁰	24.99 ²⁵	29.8 ⁸	59.83 ⁵³	70.6 ¹⁸
15.9	36.17 ²⁶	32.9 ²⁸	13.35 ⁴¹	45.2 ⁶	25.24 ²⁹	30.6 ¹⁰	60.36 ⁶¹	68.8 ¹³
25.9	36.43 ³⁰	30.1 ²⁷	13.76 ⁴⁵	44.6 ¹	25.53 ³²	31.6 ¹²	60.97 ⁶⁹	67.5 ⁹
35.8	36.73	27.4	14.21	44.5	25.85	32.8	61.66	66.6
Sec δ, Tan δ	1.105	+0.470	1.616	-1.270	1.061	-0.354	2.713	-2.522
Mean Place	34°.057	58''.37	10°.234	34''.94	22°.364	15''.06	57°.253	60''.14
D'ψ α, Dω α	-0.01	+0.02	+0.02	-0.06	+0.01	-0.02	+0.05	-0.11
Dψ δ, Dω δ	-0.3	-0.7	-0.3	-0.7	-0.3	-0.7	-0.3	-0.7

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	ϵ Serpentis. Mag. 5.4		δ Boötis. Mag. 3.5		β Libræ. Mag. 2.7		γ Ursæ Minoris. Mag. 3.1	
	Right Ascension.	Declination N.	Right Ascension.	Declination N.	Right Ascension.	Declination S.	Right Ascension.	Declination N.
	h m 15 10	° ' " + 5 14	h m 15 12	° ' " + 33 37	h m 15 12	° ' " - 9 4	h m 15 20	° ' " + 72 7
un. 0.9	57.47	64.6	4.20	34.8	25.51	18.7	49.33	48.0
10.8	57.77 ³⁰	62.5 ²¹	4.52 ³²	32.1 ²⁷	25.83 ³²	20.4 ¹⁷	49.94 ⁶¹	45.3 ²⁷
20.8	58.09 ³²	60.5 ²⁰	4.87 ³⁵	29.8 ²³	26.16 ³³	22.0 ¹⁶	50.63 ⁶⁹	43.1 ²²
30.8	58.42 ³³	58.7 ¹⁸	5.22 ³⁵	27.9 ¹⁹	26.49 ³³	23.6 ¹⁶	51.37 ⁷⁴	41.5 ¹⁶
eb. 9.7	58.74 ³¹	57.2 ¹²	5.58 ³⁴	26.5 ⁸	26.82 ³²	25.1 ¹⁴	52.14 ⁷⁷	40.6 ⁹
19.7	59.05 ³⁰	56.0	5.92	25.7	27.14 ³⁰	26.5 ¹²	52.91 ⁷⁴	40.4
ar. 1.7	59.35 ²⁷	55.1 ⁹	6.25 ³⁰	25.5 ²	27.44 ²⁸	27.7 ¹²	53.65 ⁶⁹	40.8 ⁴
11.7	59.62 ²⁵	54.6 ⁵	6.55 ²⁸	25.8 ³	27.72 ²⁶	28.6 ⁷	54.34 ⁶²	41.9 ¹¹
21.6	59.87 ²²	54.4 ²	6.83 ²⁴	26.7 ¹³	27.98 ²⁴	29.3 ⁵	54.96 ⁵³	43.6 ²²
31.6	60.09 ²⁰	54.6 ⁴	7.07 ²⁰	28.0 ¹⁷	28.22 ²⁰	29.8 ³	55.49 ⁴²	45.8 ²⁶
or. 10.6	60.29 ¹⁷	55.0 ⁷	7.27 ¹⁷	29.7 ²⁰	28.42 ¹⁸	30.1 ¹	55.91 ³¹	48.4
20.6	60.46 ¹³	55.7 ⁹	7.44 ¹³	31.7 ²³	28.60 ¹⁵	30.2 ¹	56.22 ¹⁹	51.3 ²⁹
30.5	60.59 ¹¹	56.6 ¹⁰	7.57 ⁹	34.0 ²⁴	28.75 ¹²	30.1 ²	56.41 ⁷	54.4 ³¹
ay 10.5	60.70 ⁸	57.6 ¹²	7.66 ⁶	36.4 ²⁴	28.87 ⁹	29.9 ³	56.48 ⁶	57.6 ³²
20.5	60.78 ⁵	58.8 ¹²	7.72 ¹	38.8 ²⁴	28.96 ⁶	29.6 ⁴	56.42 ¹⁷	60.8 ³²
30.4	60.83 ²	60.0 ¹¹	7.73 ²	41.2 ²³	29.02 ³	29.2 ⁵	56.25 ²⁸	63.9
ne 9.4	60.85 ⁰	61.1 ¹²	7.71 ⁵	43.5 ²¹	29.05 ⁰	28.7 ⁵	55.97 ³⁷	66.7 ²⁸
19.4	60.85 ⁴	62.3 ¹¹	7.66 ⁹	45.6 ¹⁹	29.05 ³	28.2 ⁵	55.60 ⁴⁷	69.2 ²⁵
29.4	60.81 ⁶	63.4 ⁹	7.57 ¹¹	47.5 ¹⁶	29.02 ⁵	27.7 ⁵	55.13 ⁵⁴	71.4 ¹⁷
ly 9.3	60.75 ⁹	64.3 ⁷	7.46 ¹⁴	49.1 ¹³	28.97 ⁸	27.2 ⁵	54.59 ⁶¹	73.1 ¹²
19.3	60.66 ¹¹	65.2 ⁷	7.32 ¹⁷	50.4 ⁹	28.89 ¹⁰	26.7 ⁵	53.98 ⁶⁵	74.3 ⁸
29.3	60.55 ¹²	65.9 ⁵	7.15 ¹⁹	51.3 ⁵	28.79 ¹²	26.2 ⁵	53.33 ⁶⁹	75.1 ²
g. 8.3	60.43 ¹⁴	66.4 ⁴	6.96 ¹⁹	51.8 ¹	28.67 ¹⁴	25.8 ⁵	52.64 ⁷⁰	75.3
18.2	60.29 ¹⁴	66.8 ²	6.77 ²⁰	51.9 ³	28.53 ¹⁴	25.3 ⁴	51.94 ⁷¹	75.0 ⁸
28.2	60.15 ¹⁴	67.0 ⁰	6.57 ¹⁹	51.6 ⁷	28.39 ¹³	24.9 ³	51.23 ⁶⁹	74.2 ¹⁴
ot. 7.2	60.01 ¹³	67.0 ²	6.38 ¹⁸	50.9 ¹¹	28.26 ¹³	24.6 ³	50.54 ⁶⁵	72.8
17.1	59.88 ¹²	66.8 ⁴	6.20 ¹⁶	49.8 ¹⁴	28.13 ¹¹	24.3 ¹	49.89 ⁶⁰	71.0 ¹⁸
27.1	59.76 ⁹	66.4 ⁷	6.04 ¹³	48.4 ¹⁹	28.02 ⁸	24.2 ⁰	49.29 ⁵³	68.7 ²³
7.1	59.67 ⁵	65.7 ⁹	5.91 ⁵	46.5 ²²	27.94 ¹	24.2 ³	48.76 ³⁴	66.0 ²⁷
17.1	59.62 ¹	64.8 ¹¹	5.82 ⁵	44.3 ²⁵	27.89 ¹	24.3 ³	48.32 ³⁴	62.9 ³¹
27.0	59.61 ³	63.7 ¹⁴	5.77 ⁰	41.8 ²⁸	27.88 ⁴	24.6 ⁶	47.98 ²²	59.5
v. 6.0	59.64 ⁹	62.3 ¹⁶	5.77 ⁵	39.0 ³⁰	27.92 ⁹	25.2 ⁷	47.76 ¹⁰	55.9 ³⁶
16.0	59.73 ¹³	60.7 ¹⁸	5.82 ¹¹	36.0 ³²	28.01 ¹⁴	25.9 ¹²	47.66 ¹⁸	52.2 ³⁷
26.0	59.86 ²²	58.9 ²¹	5.93 ²²	32.8 ³²	28.15 ²⁴	26.8 ¹³	47.70 ³¹	48.3 ³⁹
5.9	60.04 ²²	57.0 ²¹	6.10 ²²	29.6 ³²	28.34 ²⁴	28.0 ¹³	47.88 ³¹	44.5 ³⁶
15.9	60.26 ²⁶	54.9 ²²	6.32 ²⁷	26.4 ³⁰	28.58 ²⁷	29.3 ¹⁵	48.19 ⁴³	40.9
25.9	60.52 ²⁹	52.7 ²¹	6.59 ³⁰	23.4 ²⁹	28.85 ³⁰	30.8 ¹⁶	48.62 ⁵⁵	37.6 ³³
35.8	60.81 ²⁹	50.6	6.89	20.5	29.15	32.4	49.17	34.6 ³⁰
Tan δ	1.004	+0.092	1.201	+0.665	1.013	-0.160	3.260	+3.102
Place	57°.747	75°.36	4°.567	52°.65	25°.843	11°.92	51°.290	71°.12
D. α	0.00	0.00	-0.01	+0.03	0.00	-0.01	-0.06	+0.13
D. δ	-0.3	-0.7	-0.3	-0.7	-0.3	-0.7	-0.3	-0.8

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	μ Boötis <i>pr.</i> Mag. 4.5		τ^1 Serpentis. Mag. 5.5		ϵ Draconis. Mag. 3.5		32 Libræ. Mag. 5.9	
	Right Ascension.	Declination N.	Right Ascension.	Declination N.	Right Ascension.	Declination N.	Right Ascension.	Declination S.
	h m	° '	h m	° '	h m	° '	h m	° '
	15 21	+37 39	15 21	+15 43	15 23	+59 15	15 23	-16 25
	s	"	s	"	s	"	s	"
Jan. 0.9	16.29	70.4	50.42	20.8	1.32	26.5	27.18	20.3
10.8	16.61 ³²	67.6 ²⁸	50.72 ³⁰	18.4 ²⁴	1.74 ⁴²	23.6 ²⁹	27.50 ³²	21.7 ¹⁴
20.8	16.96 ³⁵	65.3 ²³	51.04 ³²	16.3 ²¹	2.20 ⁴⁶	21.2 ²⁴	27.83 ³³	23.1 ¹⁴
30.8	17.32 ³⁶	63.4 ¹⁹	51.36 ³²	14.4 ¹⁹	2.69 ⁴⁹	19.4 ¹⁸	28.18 ³⁵	24.5 ¹⁴
Feb. 9.8	17.68 ³⁶	62.0 ¹⁴	51.69 ³³	12.9 ¹⁵	3.19 ⁵⁰	18.3 ¹¹	28.52 ³⁴	25.9 ¹⁴
		8		11		5		33
19.7	18.04	61.2	52.01	11.8	3.69	17.8	28.85	27.3
Mar. 1.7	18.38 ³⁴	61.0 ²	52.31 ³⁰	11.1 ⁷	4.17 ⁴⁸	18.0 ²	29.16 ³¹	28.5 ¹²
11.7	18.70 ³²	61.4 ⁴	52.59 ²⁸	10.9 ²	4.62 ⁴⁵	18.8 ⁸	29.46 ³⁰	29.6 ¹¹
21.6	18.99 ²⁹	62.3 ⁹	52.85 ²⁶	11.1 ²	5.02 ⁴⁰	20.3 ¹⁵	29.73 ²⁷	30.5 ⁹
31.6	19.25 ²⁶	63.7 ¹⁴	53.08 ²³	11.7 ⁶	5.37 ³⁵	22.3 ²⁰	29.98 ²⁵	31.3 ⁸
		18		21		24		22
Apr. 10.6	19.47	65.5	53.29	12.6	5.66	24.7	30.20	31.9
20.6	19.65 ¹⁸	67.7 ²²	53.46 ¹⁷	13.9 ¹³	5.89 ²³	27.4 ²⁷	30.40 ²⁰	32.4 ⁵
30.5	19.79 ¹⁴	70.1 ²⁴	53.60 ¹⁴	15.3 ¹⁴	6.04 ¹⁵	30.4 ³⁰	30.56 ¹⁶	32.7 ³
May 10.5	19.89 ¹⁰	72.7 ²⁶	53.72 ¹²	16.9 ¹⁶	6.13 ⁹	33.5 ³¹	30.70 ¹⁴	32.9 ²
20.5	19.94 ⁵	75.3 ²⁶	53.80 ⁸	18.6 ¹⁷	6.15 ²	36.7 ³²	30.81 ¹¹	33.0 ¹
		26		5		30		0
30.5	19.96	77.9	53.85	20.4	6.10	39.7	30.89	33.0
June 9.4	19.94 ²	80.4 ²⁵	53.87 ²	22.1 ¹⁷	5.99 ¹¹	42.5 ²⁸	30.93 ⁴	32.9 ¹
19.4	19.88 ⁶	82.6 ²²	53.86 ¹	23.7 ¹⁶	5.82 ¹⁷	45.1 ²⁶	30.94 ¹	32.8 ¹
29.4	19.79 ⁹	84.7 ²¹	53.81 ⁵	25.2 ¹⁵	5.60 ²²	47.4 ²³	30.93 ¹	32.6 ³
July 9.3	19.66 ¹³	86.4 ¹⁷	53.74 ⁷	26.5 ¹³	5.33 ²⁷	49.2 ¹⁸	30.88 ⁵	32.3 ³
		14		9		14		3
19.3	19.51	87.8	53.65	27.6	5.01	50.6	30.80	32.0
29.3	19.33 ¹⁸	88.8 ¹⁰	53.53 ¹²	28.4 ⁸	4.67 ³⁴	51.5 ⁹	30.70 ¹⁰	31.7 ³
Aug. 8.3	19.13 ²⁰	89.3 ⁵	53.39 ¹⁴	29.0 ⁶	4.30 ³⁷	51.9 ⁴	30.58 ¹²	31.3 ⁴
18.2	18.92 ²¹	89.5 ²	53.24 ¹⁵	29.4 ⁴	3.91 ³⁹	51.8 ¹	30.44 ¹⁴	30.9 ⁵
28.2	18.71 ²¹	89.3 ²	53.09 ¹⁶	29.5 ²	3.52 ³⁸	51.2 ⁶	30.30 ¹⁴	30.4 ⁴
		7		2		11		4
Sept. 7.2	18.49	88.6	52.93	29.3	3.14	50.1	30.16	30.0
17.2	18.29 ²⁰	87.5 ¹¹	52.78 ¹⁵	28.8 ⁵	2.78 ³⁶	48.5 ¹⁶	30.02 ¹⁴	29.6 ⁴
27.1	18.10 ¹⁹	85.9 ¹⁶	52.65 ¹³	28.0 ⁸	2.44 ³⁴	46.5 ²⁰	29.90 ¹²	29.1 ⁵
Oct. 7.1	17.95 ¹⁵	84.0 ¹⁹	52.54 ¹¹	26.9 ¹¹	2.15 ²⁹	44.0 ²⁵	29.80 ¹⁰	28.8 ³
17.1	17.84 ¹¹	81.7 ²³	52.47 ⁷	25.6 ¹³	1.92 ²³	41.1 ²⁹	29.75 ⁵	28.6 ²
		26		3		32		1
27.0	17.77	79.1	52.44	23.9	1.75	37.9	29.74	28.5
Nov. 6.0	17.75 ²	76.2 ²⁹	52.45 ¹	22.0 ¹⁹	1.65 ¹⁰	34.4 ³⁵	29.77 ³	28.5 ⁰
16.0	17.78 ³	73.1 ³¹	52.52 ⁷	19.9 ²¹	1.63 ²	30.8 ³⁶	29.85 ⁸	28.7 ²
26.0	17.88 ¹⁰	69.8 ³³	52.63 ¹¹	17.5 ²⁴	1.70 ⁷	27.0 ³⁸	29.99 ¹⁴	29.2 ⁷
Dec. 5.9	18.04 ¹⁶	66.5 ³³	52.79 ¹⁶	15.1 ²⁴	1.86 ¹⁶	23.3 ³⁷	30.18 ¹⁹	29.9 ⁷
		33		21		23		23
15.9	18.25	63.2	53.00	12.5	2.09	19.6	30.41	30.8
25.9	18.51 ²⁶	60.0 ³²	53.25 ²⁵	10.0 ²⁵	2.40 ³¹	16.2 ³⁴	30.69 ²⁸	31.9 ¹¹
35.9	18.81 ³⁰	57.0 ³⁰	53.53 ²⁸	7.5 ²⁵	2.78 ³⁸	13.1 ³¹	30.99 ³⁰	33.1 ¹²
Sec δ , Tan δ	1.263	+0.772	1.039	+0.281	1.956	+1.681	1.043	-0.295
Mean Place	16°.763	88°.94	50°.763	34°.32	2°.326	48°.31	27°.596	15°.31
$D'\psi a$, $D_w a$	-0.02	+0.03	-0.01	+0.01	-0.03	+0.07	+0.01	-0.01
$D'\psi \delta$, $D_w \delta$	-0.3	-0.8	-0.3	-0.8	-0.3	-0.8	-0.3	-0.8

FOR THE UPPER TRANSIT AT WASHINGTON.

an Solar Date.	ρ Octantis. Mag. 5.7		β Coronæ Borealis. Mag. 3.7		ν^1 Boötis. Mag. 5.2		γ Lupi (mean). Mag. 3.0	
	Right Ascension.	Declina- tion S.	Right Ascension.	Declina- tion N.	Right Ascension.	Declina- tion N.	Right Ascension.	Declina- tion S.
	h m 15 23	° ' " -84 10	h m 15 24	° ' " +29 23	h m 15 27	° ' " +41 6	h m 15 29	° ' " -40 52
a. 0.9	20.35	58.2	19.06	36.4	52.00	61.1	27.49	54.8
10.8	22.66 ²³¹	57.0 ¹²	19.37 ³¹	33.8 ²⁶	52.33 ³³	58.3 ²⁸	27.88 ³⁹	55.1 ³
20.8	25.13 ²⁴⁷	56.3 ⁷	19.69 ³²	31.4 ²⁴	52.68 ³⁵	55.8 ²⁵	28.29 ⁴¹	55.7 ⁶
30.8	27.71 ²⁵⁸	56.2 ¹	20.04 ³⁵	29.5 ¹⁹	53.05 ³⁷	53.9 ¹⁹	28.71 ⁴²	56.5 ⁸
b. 9.8	30.32 ²⁶¹	56.6 ⁴	20.38 ³⁴	28.0 ¹⁵	53.43 ³⁸	52.5 ¹⁴	29.13 ⁴²	57.6 ¹¹
	32.91 ²⁵⁹	57.6 ¹⁰	20.71 ³³	27.1 ⁹	53.80 ³⁷	51.7 ⁸	29.54 ⁴¹	58.9 ¹³
r. 1.7	35.42 ²⁵¹	59.0 ¹⁴	21.04 ³³	26.7 ⁴	54.15 ³⁵	51.5 ²	29.93 ³⁹	60.3 ¹⁴
11.7	37.79 ²³⁷	60.9 ¹⁹	21.34 ³⁰	26.8 ¹	54.49 ³⁴	51.9 ⁴	30.31 ³⁸	61.8 ¹⁵
21.6	39.98 ²¹⁹	63.2 ²³	21.61 ²⁷	27.5 ⁷	54.79 ³⁰	52.8 ⁹	30.65 ³⁴	63.4 ¹⁶
31.6	41.96 ¹⁹⁸	65.9 ²⁷	21.86 ²⁵	28.6 ¹¹	55.06 ²⁷	54.3 ¹⁵	30.97 ³²	65.1 ¹⁷
	43.69 ¹⁷³	68.8 ²⁹	22.07 ²¹	30.1 ¹⁵	55.30 ²⁴	56.3 ²⁰	31.25 ²⁸	66.8 ¹⁷
r. 10.6	45.14 ¹⁴⁵	71.9 ³¹	22.25 ¹⁸	32.0 ¹⁹	55.49 ¹⁹	58.5 ²²	31.50 ²⁵	68.4 ¹⁶
20.6	46.29 ¹¹⁵	75.2 ³³	22.39 ¹⁴	34.1 ²¹	55.64 ¹⁵	61.1 ²⁶	31.72 ²²	70.0 ¹⁶
y 10.5	47.11 ⁸²	78.5 ³³	22.49 ¹⁰	36.3 ²²	55.74 ¹⁰	63.8 ²⁷	31.90 ¹⁸	71.6 ¹⁶
20.5	47.60 ⁴⁹	81.8 ³³	22.56 ⁷	38.6 ²³	55.80 ⁶	66.5 ²⁷	32.03 ¹³	73.2 ¹⁶
	47.74 ¹⁴	85.1 ³³	22.60 ⁴	41.0 ²⁴	55.82 ²	69.2 ²⁷	32.13 ¹⁰	74.6 ¹⁴
te 9.4	47.54 ²⁰	88.2 ³¹	22.60 ⁰	43.2 ²²	55.80 ²	71.8 ²⁶	32.19 ⁶	75.8 ¹²
19.4	47.01 ⁵³	91.2 ³⁰	22.57 ³	45.3 ²¹	55.74 ⁶	74.2 ²⁴	32.21 ²	77.0 ¹²
29.4	46.16 ⁸⁵	93.8 ²⁶	22.50 ⁷	47.2 ¹⁹	55.64 ¹⁰	76.4 ²²	32.18 ³	77.9 ⁹
y 9.3	45.02 ¹¹⁴	96.0 ¹⁰	22.40 ¹⁰	48.8 ¹⁶	55.50 ¹⁴	78.2 ¹⁸	32.11 ⁷	78.7 ⁸
	43.62 ¹⁴⁰	97.8 ¹⁸	22.28 ¹²	50.1 ¹³	55.33 ¹⁷	79.6 ¹⁴	32.01 ¹⁰	79.2 ⁵
19.3	42.01 ¹⁶¹	99.2 ¹⁴	22.13 ¹⁵	51.1 ¹⁰	55.14 ¹⁹	80.7 ¹¹	31.87 ¹⁴	79.5 ³
29.3	40.25 ¹⁷⁶	100.0 ⁸	21.96 ¹⁷	51.7 ⁶	54.93 ²¹	81.3 ⁶	31.70 ¹⁷	79.6 ¹
g. 8.3	38.40 ¹⁸⁵	100.3 ³	21.78 ¹⁸	52.0 ³	54.70 ²³	81.5 ²	31.52 ¹⁸	79.3 ³
18.2	36.52 ¹⁸⁸	100.0 ³	21.59 ¹⁹	51.9 ¹	54.46 ²⁴	81.2 ³	31.32 ²⁰	78.8 ⁵
28.2	34.69 ¹⁸³	99.1 ⁹	21.40 ¹⁹	51.4 ⁵	54.23 ²³	80.6 ⁶	31.13 ¹⁹	78.1 ⁷
pt. 7.2	32.98 ¹⁷¹	97.7 ¹⁴	21.23 ¹⁷	50.6 ⁸	54.01 ²²	79.4 ¹²	30.94 ¹⁹	77.1 ¹⁰
17.2	31.47 ¹⁵¹	95.8 ¹⁹	21.07 ¹⁶	49.3 ¹³	53.80 ²¹	77.8 ¹⁶	30.78 ¹⁶	76.0 ¹¹
27.1	30.23 ¹²⁴	93.4 ²⁴	20.93 ¹⁴	47.7 ¹⁶	53.63 ¹⁷	75.9 ¹⁹	30.65 ¹³	74.7 ¹³
t. 7.1	29.32 ⁹¹	90.8 ²⁶	20.84 ⁹	45.8 ¹⁹	53.50 ¹³	73.5 ²⁴	30.57 ⁸	73.3 ¹⁴
17.1	28.79 ⁵³	87.8 ³⁰	20.78 ⁶	43.5 ²³	53.41 ⁹	70.8 ²⁷	30.54 ³	71.9 ¹⁴
27.0	28.67 ¹²	84.8 ³⁰	20.77 ¹	40.9 ²⁶	53.37 ⁴	67.8 ³⁰	30.57 ³	70.5 ¹⁴
v. 6.0	28.98 ³¹	81.6 ³²	20.82 ⁵	38.1 ²⁸	53.40 ³	64.6 ³²	30.67 ¹⁰	69.3 ¹²
16.0	29.73 ⁷⁵	78.6 ³⁰	20.92 ¹⁰	35.2 ²⁹	53.48 ⁸	61.2 ³⁴	30.83 ¹⁶	68.2 ¹¹
26.0	30.90 ¹¹⁷	75.9 ²⁷	21.08 ¹⁶	32.2 ³⁰	53.63 ¹⁵	57.8 ³⁴	31.06 ²³	67.4 ⁸
c. 5.9	32.45 ¹⁵⁵	73.4 ²⁵	21.28 ²⁰	29.1 ³¹	53.83 ²⁰	54.4 ³⁴	31.34 ²⁸	66.8 ⁶
15.9	34.33 ¹⁸⁸	71.4 ²⁰	21.53 ²⁵	26.1 ³⁰	54.09 ²⁶	51.1 ³³	31.67 ³³	66.6 ²
25.9	36.49 ²¹⁶	69.8 ¹⁶	21.81 ²⁸	23.3 ²⁸	54.39 ³⁰	48.1 ³⁰	32.04 ³⁷	66.6 ⁰
35.9								
Tan δ	9.876	-9.825	1.148	+0.563	1.327	+0.873	1.323	-0.866
Place	29°.89*	65''.28	19°.475	53''.12	52°.571	80''.07	28°.255	55''.46
D ₀ a	+0.20	-0.41	-0.01	+0.02	-0.02	+0.04	+0.02	-0.04
D ₀ δ	-0.3	-0.8	-0.3	-0.8	-0.2	-0.8	-0.2	-0.8

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	γ Libræ. Mag. 4.0		α Coronæ Borealis. Mag. 2.3		ζ Cor. Bor. seq. Mag. 5.1		α Serpentis. Mag. 2.8	
	Right Ascension.	Declination S.	Right Ascension.	Declination N.	Right Ascension.	Declination N.	Right Ascension.	Declination N.
	h m 15 30	° ' " - 14 30	h m 15 31	° ' " + 26 59	h m 15 36	° ' " + 36 54	h m 15 40	° ' " + 64 1
Jan. 0.9	45.72 ^s	29.7 ["]	4.87 ^s	44.2 ["]	10.06 ^s	22.4 ["]	4.38 ^s	21.2 ["]
10.8	46.03 ³¹	31.1 ¹⁴	5.17 ³⁰	41.5 ²⁷	10.37 ³¹	19.5 ²⁹	4.67 ²⁹	19.1 ²¹
20.8	46.36 ³³	32.5 ¹⁴	5.49 ³²	39.2 ²³	10.71 ³⁴	17.0 ²⁵	4.98 ³¹	17.1 ²⁰
30.8	46.70 ³⁴	34.0 ¹⁵	5.83 ³⁴	37.3 ¹⁹	11.06 ³⁵	15.0 ²⁰	5.30 ³²	15.3 ¹⁸
Feb. 9.8	47.04 ³⁴	35.4 ¹⁴	6.17 ³⁴	35.7 ¹⁶	11.42 ³⁶	13.5 ¹⁵	5.62 ³²	13.8 ¹⁵
	32	12	33	10	36	9	31	12
19.7	47.36	36.6	6.50	34.7	11.78	12.6	5.93	12.6
Mar. 1.7	47.68 ³²	37.8 ¹²	6.82 ³²	34.2 ⁵	12.12 ³⁴	12.3 ³	6.24 ³¹	11.8 ⁸
11.7	47.98 ³⁰	38.8 ¹⁰	7.12 ³⁰	34.3 ¹	12.44 ³²	12.5 ²	6.53 ²⁹	11.3 ⁵
21.7	48.25 ²⁷	39.6 ⁸	7.39 ²⁷	34.8 ⁵	12.74 ³⁰	13.3 ⁸	6.79 ²⁶	11.2 ¹
31.6	48.50 ²⁵	40.3 ⁷	7.64 ²⁵	35.8 ¹⁰	13.01 ²⁷	14.6 ¹³	7.03 ²⁴	11.4 ²
	23	5	22	14	23	18	22	5
Apr. 10.6	48.73	40.8	7.86	37.2	13.24	16.4	7.25	11.9
20.6	48.93 ²⁰	41.1 ³	8.04 ¹⁸	39.0 ¹⁸	13.44 ²⁰	18.5 ²¹	7.45 ²⁰	12.7 ⁸
30.5	49.10 ¹⁷	41.3 ²	8.19 ¹⁵	41.0 ²⁰	13.59 ¹⁵	20.9 ²⁴	7.61 ¹⁶	13.7 ¹⁰
May 10.5	49.24 ¹⁴	41.3 ⁰	8.31 ¹²	43.1 ²¹	13.71 ¹²	23.5 ²⁶	7.74 ¹³	14.9 ¹²
20.5	49.36 ¹²	41.3 ⁰	8.39 ⁸	45.4 ²³	13.79 ⁸	26.1 ²⁶	7.85 ¹¹	16.2 ¹³
	8	1	4	22	3	26	7	14
30.5	49.44	41.2	8.43	47.6	13.82	28.7	7.92	17.6
June 9.4	49.49 ⁵	41.0 ²	8.44 ¹	49.8 ²²	13.82 ⁰	31.3 ²⁶	7.97 ⁵	18.9 ¹³
19.4	49.51 ²	40.7 ³	8.42 ²	51.8 ²⁰	13.78 ⁴	33.6 ²³	7.98 ¹	20.2 ¹³
29.4	49.50 ¹	40.4 ³	8.37 ⁵	53.7 ¹⁹	13.70 ⁸	35.7 ²¹	7.97 ¹	21.5 ¹³
July 9.4	49.46 ⁴	40.1 ³	8.28 ⁹	55.3 ¹⁶	13.58 ¹²	37.6 ¹⁹	7.92 ⁸	22.6 ¹¹
	7	3	11	14	14	15	8	10
19.3	49.39	39.8	8.17	56.7	13.44	39.1	7.84	23.6
29.3	49.29 ¹⁰	39.4 ⁴	8.03 ¹⁴	57.7 ¹⁰	13.27 ¹⁷	40.2 ¹¹	7.74 ¹⁰	24.4 ⁸
Aug. 8.3	49.17 ¹²	39.0 ⁴	7.87 ¹⁶	58.4 ⁷	13.08 ¹⁹	41.0 ⁸	7.62 ¹²	25.0 ⁶
18.2	49.03 ¹⁴	38.6 ⁴	7.70 ¹⁷	58.8 ⁴	12.87 ²¹	41.3 ³	7.48 ¹⁴	25.5 ⁵
28.2	48.89 ¹⁴	38.2 ⁴	7.51 ¹⁹	58.7 ¹	12.65 ²²	41.2 ¹	7.33 ¹⁵	25.8 ³
	15	4	18	3	22	5	15	0
Sept. 7.2	48.74	37.8	7.33	58.4	12.43	40.7	7.18	25.8
17.2	48.60 ¹⁴	37.4 ⁴	7.16 ¹⁷	57.6 ⁸	12.22 ²¹	39.7 ¹⁰	7.03 ¹⁵	25.7 ¹
27.1	48.48 ¹²	37.1 ³	7.00 ¹⁶	56.5 ¹¹	12.03 ¹⁹	38.3 ¹⁴	6.90 ¹³	25.3 ⁴
Oct. 7.1	48.38 ¹⁰	36.8 ³	6.86 ¹⁴	55.0 ¹⁵	11.86 ¹⁷	36.5 ¹⁸	6.79 ¹¹	24.7 ⁶
17.1	48.32 ⁶	36.7 ¹	6.76 ¹⁰	53.2 ¹⁸	11.73 ¹³	34.4 ²¹	6.71 ⁸	23.8 ⁹
	2	0	5	21	8	25	4	12
27.1	48.30	36.7	6.71	51.1	11.65	31.9	6.67	22.6
Nov. 6.0	48.32 ²	36.9 ²	6.70 ¹	48.6 ²⁵	11.61 ⁴	29.1 ²⁸	6.68 ¹	21.5 ¹³
16.0	48.40 ⁸	37.2 ³	6.74 ⁴	45.9 ²⁷	11.63 ²	26.1 ³⁰	6.73 ⁵	19.7 ¹⁶
26.0	48.53 ¹³	37.7 ⁵	6.83 ⁹	43.1 ²⁸	11.71 ⁸	22.9 ³²	6.83 ¹⁰	17.9 ²⁰
Dec. 5.9	48.71 ¹⁸	38.5 ⁸	6.98 ¹⁵	40.2 ²⁹	11.85 ¹⁴	19.6 ³³	6.98 ¹⁵	15.9 ²¹
	22	10	20	30	19	33	20	
15.9	48.93	39.5	7.18	37.2	12.04	16.3	7.18	13.8
25.9	49.20 ²⁷	40.6 ¹¹	7.42 ²⁴	34.3 ²⁹	12.28 ²⁴	13.1 ³²	7.42 ²⁴	11.7 ²¹
35.9	49.50 ³⁰	41.9 ¹³	7.70 ²⁸	31.5 ²⁸	12.57 ²⁹	10.1 ³⁰	7.69 ²⁷	9.6 ²¹
Sec δ , Tan δ	1.033	-0.259	1.122	+0.509	1.251	+0.751	1.007	+0.117
Mean Place	46°.151	24°.03	5°.313	60°.25	10°.632	40°.29	4°.796	32°.38
$D'_{\psi a}, D_{\omega a}$	+0.01	-0.01	-0.01	+0.02	-0.02	+0.03	0.00	0.00
$D'_{\psi \delta}, D_{\omega \delta}$	-0.2	-0.8	-0.2	-0.8	-0.2	-0.8	-0.2	-0.8

FOR THE UPPER TRANSIT AT WASHINGTON.

an Solar Date.	β Serpentis. Mag. 3.7		κ Serpentis. Mag. 4.3		μ Serpentis. Mag. 3.6		12 H. Draconis. Mag. 5.1	
	Right Ascension.	Declination N.	Right Ascension.	Declination N.	Right Ascension.	Declination S.	Right Ascension.	Declination N.
	h m 15 42	° ' + 15 40	h m 15 44	° ' + 18 23	h m 15 45	° ' - 3 10	h m 15 45	° ' + 62 51
	s 15.44	" 60.1	s 15.43	" 58.0	s 15.51	" 23.8	s 20.56	" 21.9
n. 0.9	15.44 ²⁸	60.1 ²⁴	54.30 ²⁸	58.0 ²⁵	10.51 ²⁹	23.8 ¹⁸	20.56 ⁴²	21.9 ³⁰
10.9	15.72 ³¹	57.7 ²²	54.58 ³¹	55.5 ²³	10.80 ³¹	25.6 ¹⁷	20.98 ⁴⁷	18.9 ²⁶
20.8	16.03 ³²	55.5 ¹⁹	54.89 ³²	53.2 ¹⁹	11.11 ³²	27.3 ¹⁶	21.45 ⁵¹	16.3 ²⁰
30.8	16.35 ³²	53.6 ¹⁵	55.21 ³²	51.3 ¹⁶	11.43 ³²	28.9 ¹²	21.96 ⁵⁵	14.3 ⁷
b. 9.8	16.67 ³²	52.1 ¹²	55.54 ³²	49.7 ¹¹	11.75 ³²	30.3 ¹²	22.50 ⁵⁵	13.0 ²³
19.7	16.99 ³¹	50.9 ⁷	55.86 ³¹	48.6 ⁷	12.07 ³¹	31.5 ¹⁰	23.05 ⁵⁴	12.3 ⁶
ar. 1.7	17.30 ²⁹	50.2 ³	56.17 ²⁹	47.9 ²	12.38 ²⁹	32.5 ⁷	23.59 ⁵⁰	12.3 ¹³
11.7	17.59 ²⁷	49.9 ⁶	56.46 ²⁷	47.7 ⁶	12.67 ²⁷	33.2 ¹	24.09 ⁴²	12.9 ¹⁹
21.7	17.86 ²⁴	50.1 ⁹	56.73 ²⁴	47.9 ¹¹	12.94 ²⁴	33.7 ³	24.56 ³⁵	14.2 ²³
31.6	18.10 ²²	50.7 ⁹	56.98 ²²	48.5 ¹¹	13.19 ²⁵	33.8 ¹	24.98 ³⁵	16.1 ³¹
pr. 10.6	18.32 ²⁰	51.6 ¹²	57.20 ²⁰	49.6 ¹³	13.42 ²⁰	33.7 ³	25.33 ²⁸	18.4 ²⁷
20.6	18.52 ¹⁶	52.8 ¹⁵	57.40 ¹⁶	50.9 ¹⁶	13.62 ¹⁷	33.4 ⁵	25.61 ²¹	21.1 ³⁰
30.6	18.68 ¹³	54.3 ¹⁷	57.56 ¹³	52.5 ¹⁸	13.79 ¹⁵	32.9 ⁶	25.82 ¹²	24.1 ³²
ay 10.5	18.81 ¹⁰	56.0 ¹⁸	57.69 ¹⁰	54.3 ¹⁹	13.94 ¹²	32.3 ⁸	25.94 ⁵	27.3 ³²
20.5	18.91 ⁷	57.7 ¹⁸	57.79 ⁷	56.2 ²⁰	14.06 ⁸	31.5 ⁸	25.99 ³	30.5 ³¹
30.5	18.98 ⁴	59.5 ¹⁸	57.86 ⁴	58.2 ¹⁹	14.14 ⁶	30.7 ⁹	25.96 ¹⁰	33.6 ³⁰
ine 9.4	19.02 ⁰	61.3 ¹⁷	57.90 ⁰	60.1 ¹⁸	14.20 ³	29.8 ⁸	25.86 ¹⁷	36.6 ²⁸
19.4	19.02 ²	63.0 ¹⁶	57.90 ³	61.9 ¹⁷	14.23 ¹	29.0 ⁸	25.69 ²⁴	39.4 ²⁵
29.4	19.00 ⁶	64.6 ¹²	57.87 ⁶	63.6 ¹⁵	14.22 ⁴	28.2 ⁷	25.45 ³⁵	41.9 ¹⁶
ily 9.4	18.94 ⁹	66.0 ¹⁰	57.81 ⁹	65.1 ¹³	14.18 ⁶	27.4 ⁷	25.15 ³⁵	44.0 ¹²
19.3	18.85 ¹¹	67.2 ¹⁰	57.72 ¹¹	66.4 ¹⁰	14.12 ⁹	26.7 ⁷	24.80 ³⁹	45.6 ⁷
29.3	18.74 ¹³	68.2 ⁷	57.61 ¹⁴	67.4 ⁸	14.03 ¹²	26.0 ⁵	24.41 ⁴²	46.8 ²
ig. 8.3	18.61 ¹⁵	68.9 ⁵	57.47 ¹⁵	68.2 ⁴	13.91 ¹³	25.5 ³	23.99 ⁴⁵	47.5 ³
18.2	18.46 ¹⁶	69.4 ¹	57.32 ¹⁶	68.6 ²	13.78 ¹⁵	25.0 ²	23.54 ⁴⁶	47.7 ⁹
28.2	18.30 ¹⁷	69.6 ¹	57.15 ¹⁷	68.8 ¹	13.63 ¹⁵	24.7 ²	23.08 ⁴⁶	47.4 ³
pt. 7.2	18.13 ¹⁶	69.5 ⁴	56.98 ¹⁶	68.7 ⁴	13.48 ¹⁴	24.5 ¹	22.62 ⁴⁴	46.5 ¹⁴
17.2	17.97 ¹⁴	69.1 ⁷	56.82 ¹⁵	68.3 ⁸	13.34 ¹³	24.4 ¹	22.18 ⁴¹	45.1 ¹⁸
27.1	17.83 ¹²	68.4 ¹⁰	56.67 ¹³	67.5 ¹¹	13.21 ¹¹	24.5 ²	21.77 ³⁷	43.3 ²³
st. 7.1	17.71 ⁹	67.4 ¹³	56.54 ¹⁰	66.4 ¹⁴	13.10 ⁸	24.7 ⁴	21.40 ³²	41.0 ²⁷
17.1	17.62 ⁵	66.1 ¹⁵	56.44 ⁶	65.0 ¹⁷	13.02 ⁴	25.1 ⁶	21.08 ²⁵	38.3 ³¹
27.1	17.57 ¹	64.6 ¹⁸	56.38 ¹	63.3 ¹⁹	12.98 ¹	25.7 ⁸	20.83 ¹⁷	35.2 ³⁴
ov. 6.0	17.56 ⁴	62.8 ²¹	56.37 ⁴	61.4 ²²	12.99 ⁵	26.5 ¹⁰	20.66 ⁸	31.8 ³⁶
16.0	17.60 ⁹	60.7 ²³	56.41 ⁹	59.2 ²⁴	13.04 ¹¹	27.5 ¹²	20.58 ¹	28.2 ³⁷
26.0	17.69 ¹⁵	58.4 ²⁵	56.50 ¹³	56.8 ²⁶	13.15 ¹⁵	28.7 ¹⁴	20.59 ²⁰	24.5 ³⁸
sc. 5.9	17.84 ¹⁹	56.0 ²⁵	56.63 ¹⁹	54.2 ²⁶	13.30 ²⁰	30.1 ¹⁵	20.70 ²⁰	20.7 ³⁷
15.9	18.03 ²³	53.5 ²⁶	56.82 ²³	51.6 ²⁶	13.50 ²⁴	31.6 ¹⁷	20.90 ²⁹	17.0 ³⁶
25.9	18.26 ²⁷	50.9 ²⁴	57.05 ²⁶	49.0 ²⁶	13.74 ²⁸	33.3 ¹⁷	21.19 ³⁷	13.4 ³²
35.9	18.53 ²⁷	48.5 ²⁴	57.31 ²⁶	46.4 ²⁶	14.02 ²⁸	35.0 ¹⁷	21.56 ³⁷	10.2 ³²
δ , Tan δ n Place	1.039 15°.876	+0.281 73''.45	1.054 15°.765	+0.333 71''.83	1.002 10°.949	-0.055 15''.08	2.192 22°.054	+1.951 43''.02
α , $D_\alpha \alpha$ δ , $D_\delta \delta$	-0.01 -0.2	+0.01 -0.8	-0.01 -0.2	+0.01 -0.8	0.00 -0.2	0.00 -0.8	-0.04 -0.2	+0.07 -0.8

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	ε Serpentis. Mag. 3.8		ζ Ursæ Minoris. Mag. 4.3		β Triang. Aust. Mag. 3.0		λ Libræ. Mag. 5.1	
	Right Ascension.	Declination N.	Right Ascension.	Declination N.	Right Ascension.	Declination S.	Right Ascension.	Declination S.
	h m 15 46	° ' " + 4 43	h m 15 46	° ' " + 78 2	h m 15 47	° ' " - 63 10	h m 15 48	° ' " - 19 54
	s s	"	s s	"	s s	"	s s	"
Jan. 0.9	34.21	48.0	60.11	61.4	36.70	6.7	23.26	55.0
10.9	34.49 ²⁸	46.0 ²⁰	60.86 ⁷⁵	58.6 ²⁸	37.27 ⁵⁷	5.9 ⁸	23.57 ³¹	56.0 ¹⁰
20.8	34.80 ³¹	44.1 ¹⁹	61.75 ⁸⁹	56.2 ²⁴	37.89 ⁶²	5.5 ⁴	23.90 ³³	57.1 ¹¹
30.8	35.11 ³¹	42.4 ¹⁷	62.74 ⁹⁹	54.4 ¹⁸	38.53 ⁶⁴	5.5 ⁰	24.25 ³⁵	58.3 ¹²
Feb. 9.8	35.43 ³²	40.9 ¹⁵	63.80 ¹⁰⁶	53.2 ¹²	39.18 ⁶⁵	6.0 ⁵	24.59 ³⁴	59.5 ¹²
19.7	35.75	39.7	64.89	52.7	39.83	6.8	24.93	60.7
Mar. 1.7	36.06 ³¹	38.8 ⁹	65.98 ¹⁰⁹	52.9 ²	40.46 ⁶³	8.0 ¹²	25.26 ³³	61.8 ¹¹
11.7	36.35 ²⁹	38.3 ⁵	67.01 ¹⁰³	53.7 ⁸	41.07 ⁶¹	9.5 ¹⁵	25.58 ³²	62.9 ¹¹
21.7	36.62 ²⁷	38.1 ²	67.95 ⁹⁴	55.1 ¹⁴	41.64 ⁵⁷	11.3 ¹⁸	25.87 ²⁹	63.8 ⁹
31.6	36.86 ²⁴	38.2 ¹	68.78 ⁸³	57.1 ²⁰	42.17 ⁵³	13.4 ²¹	26.14 ²⁷	64.5 ⁷
Apr. 10.6	37.09	38.7	69.46	59.6	42.64	15.7	26.39	65.2
20.6	37.29 ²⁰	39.4 ⁷	69.98 ⁵²	62.4 ²⁸	43.06 ⁴²	18.1 ²⁴	26.61 ²²	65.7 ⁵
30.6	37.46 ¹⁷	40.3 ⁹	70.33 ³⁵	65.5 ³¹	43.42 ³⁶	20.6 ²⁵	26.81 ²⁰	66.1 ⁴
May 10.5	37.60 ¹⁴	41.4 ¹¹	70.49 ¹⁶	68.7 ³²	43.72 ³⁰	23.1 ²⁵	26.97 ¹⁶	66.4 ³
20.5	37.71 ¹¹	42.6 ¹²	70.47 ²	71.9 ³²	43.95 ²³	25.7 ²⁶	27.11 ¹⁴	66.6 ²
30.5	37.79	43.9	70.27	75.1	44.10	28.2	27.21	66.8
June 9.4	37.85 ⁶	45.2 ¹³	69.90 ³⁷	78.0 ²⁹	44.18 ⁸	30.6 ²⁴	27.28 ⁷	66.9 ¹
19.4	37.87 ²	46.4 ¹²	69.37 ⁵³	80.7 ²⁷	44.19 ¹	32.9 ²³	27.32 ⁴	66.9 ⁰
29.4	37.86 ¹	47.6 ¹²	68.69 ⁶⁸	83.1 ²⁴	44.12 ⁷	34.9 ²⁰	27.32 ⁰	66.9 ⁰
July 9.4	37.81 ⁵	48.7 ¹¹	67.89 ⁸⁰	85.1 ²⁰	43.98 ¹⁴	36.7 ¹⁸	27.29 ³	66.8 ¹
19.3	37.74 ⁹	49.6 ⁸	66.97 ¹⁰⁰	86.6 ¹⁰	43.78	38.1 ¹¹	27.23 ¹⁰	66.7 ²
29.3	37.65 ¹²	50.4 ⁷	65.97 ¹⁰⁶	87.6 ⁶	43.51 ²⁷	39.2 ¹¹	27.13 ¹⁵	66.5 ³
Aug. 8.3	37.53 ¹⁴	51.1 ⁵	64.91 ¹¹⁰	88.2 ⁰	43.20 ³¹	39.9 ⁷	27.01 ¹²	66.2 ³
18.3	37.39 ¹⁵	51.6 ³	63.81 ¹¹²	88.2 ⁵	42.85 ³⁷	40.1 ²	26.88 ¹³	65.9 ⁴
28.2	37.24 ¹⁵	51.9 ¹	62.69 ¹¹⁰	87.7 ¹¹	42.48 ³⁷	39.9 ⁶	26.73 ¹⁵	65.5 ⁴
Sept. 7.2	37.09	52.0	61.59	86.6	42.11	39.3	26.57	65.1
17.2	36.94 ¹⁵	51.9 ¹	60.52 ¹⁰⁷	85.1 ¹⁵	41.75 ³⁶	38.2 ¹¹	26.42 ¹⁵	64.6 ⁵
27.1	36.81 ¹³	51.6 ³	59.51 ¹⁰¹	83.1 ²⁰	41.42 ³³	36.8 ¹⁴	26.28 ¹⁴	64.1 ⁴
Oct. 7.1	36.69 ¹²	51.0 ⁶	58.59 ⁹²	80.7 ²⁴	41.15 ²⁷	35.0 ¹⁸	26.17 ¹¹	63.7 ⁴
17.1	36.61 ⁸	50.3 ⁷	57.79 ⁸⁰	77.9 ²⁸	40.95 ²⁰	32.9 ²¹	26.09 ⁸	63.3 ³
27.1	36.57 ⁴	49.3 ¹⁰	57.13 ⁶⁶	74.7 ³²	40.84 ¹¹	30.6 ²³	26.05 ⁴	63.0 ²
Nov. 6.0	36.57 ⁰	48.0 ¹³	56.63 ⁵⁰	71.3 ³⁴	40.82 ²	28.2 ²⁴	26.06 ¹	62.8 ⁰
16.0	36.62 ⁵	46.6 ¹⁴	56.31 ³²	67.6 ³⁷	40.90 ⁸	25.9 ²³	26.13 ⁷	62.8 ²
26.0	36.71 ⁹	44.9 ¹⁷	56.18 ¹³	63.9 ³⁷	41.09 ¹⁹	23.6 ²³	26.24 ¹¹	63.0 ³
Dec. 6.0	36.86 ¹⁵	43.1 ¹⁸	56.26 ⁸	60.2 ³⁷	41.38 ²⁹	21.5 ²¹	26.41 ¹⁷	63.3 ⁶
15.9	37.05	41.1	56.53	56.5	41.76	19.6	26.63	63.9
25.9	37.29 ²⁴	39.1 ²⁰	57.00 ⁴⁷	53.1 ³⁴	42.23 ⁴⁷	18.1 ¹⁵	26.89 ²⁶	64.6 ¹⁰
35.9	37.55 ²⁶	37.0 ²¹	57.64 ⁶⁴	50.0 ³¹	42.76 ⁵³	17.0 ¹¹	27.18 ²⁹	65.6
Sec δ, Tan δ	1.003	+0.083	4.831	+4.726	2.216	-1.977	1.064	-0.362
Mean Place	34°.648	58°.75	64°.094	83°.35	38°.490	10°.23	23°.796	50°.15
D'ψ α, Dω α	0.00	0.00	-0.10	+0.17	+0.04	-0.07	+0.01	-0.01
D'δ δ, Dω δ	-0.2	-0.8	-0.2	-0.8	-0.2	-0.8	-0.2	-0.8

FOR THE UPPER TRANSIT AT WASHINGTON.

Sun Solar Date.	γ Serpentis. Mag. 3.9		π Scorpii. Mag. 3.0		ϵ Coronæ Borealis. Mag. 4.2		δ Scorpii. Mag. 2.5	
	Right Ascension.	Declination N.	Right Ascension.	Declination S.	Right Ascension.	Declination N.	Right Ascension.	Declination S.
	h m	° '	h m	° '	h m	° '	h m	° '
	15 52	+15 55	15 53	-25 52	15 54	+27 6	15 55	-22 22
	s	"	s	"	s	"	s	"
n. 0.9	31.08	64.8	41.78	16.6	3.47	68.5	17.67	54.8
10.9	31.36 ²⁸	62.3 ²⁵	42.11 ³³	17.4 ⁸	3.75 ²⁸	65.8 ²⁷	17.98 ³¹	55.7 ⁹
20.8	31.66 ³⁰	60.1 ²²	42.45 ³⁴	18.2 ⁸	4.06 ³¹	63.3 ²⁵	18.31 ³³	56.7 ¹⁰
30.8	31.97 ³¹	58.1 ¹⁶	42.81 ³⁶	19.2 ¹⁰	4.38 ³²	61.3 ²⁰	18.66 ³⁵	57.8 ¹¹
b. 9.8	32.29 ³²	56.5 ²⁰	43.17 ³⁶	20.3 ¹¹	4.72 ³⁴	59.6 ¹⁷	19.01 ³⁵	58.9 ¹¹
	32	12	35	11	33	11	35	11
19.7	32.61	55.3 ⁸	43.52	21.4	5.05	58.5	19.36	60.0 ¹¹
ir. 1.7	32.92 ³¹	54.5 ³	43.87 ³⁵	22.5 ¹¹	5.37 ³²	57.9 ⁶	19.69 ³³	61.1 ¹¹
11.7	33.22 ³⁰	54.2 ³	44.20 ³³	23.6 ¹¹	5.68 ³¹	57.8 ¹	20.01 ³²	62.1 ¹⁰
21.7	33.49 ²⁷	54.3 ¹	44.51 ³¹	24.6 ¹⁰	5.97 ²⁹	58.3 ⁵	20.32 ³¹	63.0 ⁹
31.6	33.75 ²⁶	54.8 ⁵	44.79 ²⁸	25.6 ¹⁰	6.23 ²⁶	59.2 ⁹	20.60 ²⁸	63.8 ⁸
	23	9	27	9	24	13	26	8
r. 10.6	33.98	55.7 ¹²	45.06	26.5 ⁸	6.47	60.5	20.86	64.6 ⁶
20.6	34.18 ²⁰	56.9 ¹²	45.29 ²³	27.3 ⁸	6.67 ²⁰	62.2 ¹⁷	21.09 ²³	65.2 ⁶
30.6	34.35 ¹⁷	58.4 ¹⁵	45.50 ²¹	28.0 ⁷	6.84 ¹⁷	64.2 ²⁰	21.29 ²⁰	65.7 ⁵
y 10.5	34.49 ¹⁴	60.0 ¹⁶	45.68 ¹⁸	28.6 ⁶	6.98 ¹⁴	66.4 ²²	21.47 ¹⁸	66.1 ⁴
20.5	34.60 ¹¹	61.8 ¹⁸	45.83 ¹⁵	29.1 ⁵	7.09 ¹¹	68.7 ²³	21.62 ¹⁵	66.4 ³
	8	18	11	5	7	24	11	3
30.5	34.68	63.6 ¹⁸	45.94	29.6	7.16	71.1	21.73	66.7
ie 9.4	34.73 ⁵	65.4 ¹⁸	46.02 ⁸	30.0 ⁴	7.19 ³	73.4 ²³	21.81 ⁸	67.0 ³
19.4	34.74 ¹	67.1 ¹⁷	46.07 ⁵	30.4 ⁴	7.19 ⁰	75.6 ²²	21.85 ⁴	67.1 ¹
29.4	34.72 ²	68.7 ¹⁶	46.07 ⁰	30.7 ³	7.15 ⁴	77.6 ²⁰	21.86 ¹	67.2 ¹
y 9.4	34.67 ⁸	70.2 ¹²	46.04 ³	30.9 ¹	7.07 ¹⁰	79.4 ¹⁵	21.83 ⁶	67.2 ⁰
			6					
19.3	34.59 ¹¹	71.4 ¹⁰	45.98 ¹⁰	31.0 ⁰	6.97 ¹³	80.9 ¹²	21.77 ⁹	67.2 ¹
29.3	34.48 ¹³	72.4 ⁸	45.88 ¹²	31.0 ⁰	6.84 ¹⁶	82.1 ⁹	21.68 ¹²	67.1 ²
g. 8.3	34.35 ¹⁵	73.2 ⁵	45.76 ¹⁴	30.8 ²	6.68 ¹⁷	83.0 ⁵	21.56 ¹⁴	66.9 ³
18.3	34.20 ¹⁶	73.7 ²	45.62 ¹⁶	30.6 ⁴	6.51 ¹⁹	83.5 ²	21.42 ¹⁶	66.6 ⁴
28.2	34.04 ¹⁷	73.9 ¹	45.46 ¹⁷	30.2 ⁴	6.32 ¹⁹	83.7 ²	21.26 ¹⁶	66.2 ⁴
t. 7.2	33.87 ¹⁶	73.8 ³	45.29 ¹⁶	29.8 ⁶	6.13 ¹⁹	83.5 ⁶	21.10 ¹⁵	65.8 ⁵
17.2	33.71 ¹⁵	73.5 ⁷	45.13 ¹⁵	29.2 ⁶	5.94 ¹⁸	82.9 ⁹	20.95 ¹⁴	65.3 ⁵
27.1	33.56 ¹³	72.8 ¹⁰	44.98 ¹²	28.6 ⁷	5.76 ¹⁵	82.0 ¹³	20.81 ¹²	64.8 ⁵
7.1	33.43 ¹⁰	71.8 ¹³	44.86 ⁸	27.9 ⁶	5.61 ¹²	80.7 ¹⁷	20.69 ⁸	64.3 ⁵
17.1	33.33 ⁶	70.5 ¹⁵	44.78 ⁵	27.3 ⁶	5.49 ⁸	79.0 ²⁰	20.61 ⁵	63.8 ⁴
27.1	33.27 ¹	69.0 ¹⁹	44.73 ¹	26.7 ⁶	5.41 ³	77.0 ²³	20.56 ⁶	63.4 ³
r. 6.0	33.26 ³	67.1 ²¹	44.74 ⁶	26.1 ⁴	5.38 ¹	74.7 ²⁶	20.56 ⁶	63.1 ²
16.0	33.29 ⁸	65.0 ²³	44.80 ¹²	25.7 ²	5.39 ⁷	72.1 ²⁸	20.62 ¹¹	62.9 ⁰
26.0	33.37 ¹³	62.7 ²⁴	44.92 ¹⁷	25.5 ²	5.46 ¹²	69.3 ²⁹	20.73 ¹⁷	62.9 ¹
6.0	33.50 ¹⁸	60.3 ²⁵	45.09 ²²	25.5 ²	5.58 ¹⁷	66.4 ³⁰	20.90 ²¹	63.0 ⁴
15.9	33.68 ²³	57.8 ²⁶	45.31 ²⁶	25.7 ³	5.75 ²²	63.4 ²⁹	21.11 ²⁶	63.4 ⁶
25.9	33.91 ²⁶	55.2 ²⁵	45.57 ³¹	26.0 ⁶	5.97 ²⁶	60.5 ²⁸	21.37 ²⁶	64.0 ⁸
35.9	34.17	52.7 ²⁵	45.88 ³¹	26.6	6.23 ²⁶	57.7 ²⁸	21.66 ²⁹	64.8
Tan δ	1.040	+0.286	1.111	-0.485	1.124	+0.512	1.081	-0.412
Place	31 ^s .567	77 ["] .98	42 ^s .394	13 ["] .02	4 ^s .044	83 ["] .97	18 ^s .247	50 ["] .38
$D_{\alpha} \alpha$	-0.01	+0.01	+0.01	-0.02	-0.01	+0.02	+0.01	-0.01
$D_{\alpha} \delta$	-0.2	-0.8	-0.2	-0.9	-0.2	-0.9	-0.2	-0.9

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	θ Draconis. Mag. 4.1		β Scorpii. Mag. 2.9		κ Herculis. Mag. 5.3		Groombridge 2320. Mag. 5.4	
	Right Ascension.	Declination N.	Right Ascension.	Declination S.	Right Ascension.	Declination N.	Right Ascension.	Declination N.
	h m 16 0	° ' +58 47	h m 16 0	° ' -19 34	h m 16 4	° ' +17 15	h m 16 6	° ' +68 1
	s 16.31	" 11.2	s 28.90	" 30.2	s 13.67	" 67.6	s 2.90	" 41.7
Jan. 0.9	16.31 ³⁶	8.0 ³²	28.90 ³⁰	31.2 ¹⁰	13.94 ²⁷	65.1 ²⁵	3.33 ⁴³	38.6 ³¹
10.9	16.67 ⁴¹	5.3 ²⁷	29.53 ³³	32.2 ¹⁰	14.24 ³⁰	62.9 ²²	3.84 ⁵¹	35.9 ²⁷
20.8	17.08 ⁴⁶	3.2 ²¹	29.87 ³⁴	33.3 ¹¹	14.55 ³¹	60.9 ²⁰	4.41 ⁵⁷	33.7 ²²
30.8	17.54 ⁴⁸	1.6 ¹⁶	30.21 ³⁴	34.5 ¹²	14.87 ³²	59.3 ¹⁶	5.03 ⁶²	32.2 ¹⁵
Feb. 9.8	18.02 ⁴⁸	9	30.21 ³⁴	34.5 ¹¹	14.87 ³²	59.3 ¹²	5.03 ⁶⁴	32.2 ⁰
19.8	18.50 ⁴⁹	0.7 ²	30.55 ³³	35.6 ¹⁰	15.19 ³¹	58.1 ⁸	5.67 ⁶⁴	31.3 ²
Mar. 1.7	18.99 ⁴⁶	0.5 ²	30.88 ³³	36.6 ¹⁰	15.50 ³⁰	57.3 ³	6.31 ⁶¹	31.1 ⁵
11.7	19.45 ⁴³	0.9 ⁴	31.20 ³²	37.6 ⁸	15.80 ²⁸	57.0 ²	6.92 ⁵⁸	31.6 ¹²
21.7	19.88 ³⁹	2.0 ¹¹	31.50 ²⁸	38.4 ⁷	16.08 ²⁶	57.2 ⁶	7.50 ⁵²	32.8 ¹⁷
31.6	20.27 ³⁴	3.7 ²²	31.78 ²⁶	39.1 ⁵	16.34 ²⁴	57.8 ¹⁰	8.02 ⁴⁵	34.5 ²²
Apr. 10.6	20.61 ²⁸	5.9 ²⁶	32.04 ²³	39.6 ⁵	16.58 ²¹	58.8 ¹³	8.47 ³⁶	36.7 ²⁷
20.6	20.89 ²²	8.5 ²⁹	32.27 ²¹	40.1 ³	16.79 ¹⁸	60.1 ¹⁵	8.83 ²⁸	39.4 ³⁰
30.6	21.11 ¹⁵	11.4 ³¹	32.48 ¹⁷	40.4 ²	16.97 ¹⁵	61.6 ¹⁸	9.11 ¹⁸	42.4 ³²
May 10.5	21.26 ⁸	14.5 ³²	32.65 ¹⁵	40.6 ¹	17.12 ¹²	63.4 ¹⁹	9.29 ⁸	45.6 ³²
20.5	21.34 ²	17.7 ³²	32.80 ¹²	40.8 ¹	17.24 ⁹	65.3 ¹⁹	9.37 ¹	48.8 ³⁵
30.5	21.36 ⁵	20.9 ³¹	32.92 ⁸	40.9 ⁰	17.33 ⁶	67.2 ²⁰	9.36 ¹¹	52.1 ³¹
June 9.5	21.31 ¹²	24.0 ²⁸	33.00 ⁴	40.9 ⁰	17.39 ²	69.2 ¹⁸	9.25 ²⁰	55.2 ³⁰
19.4	21.19 ¹⁷	26.8 ²⁶	33.04 ²	40.9 ⁰	17.41 ²	71.0 ¹⁶	9.05 ²⁸	58.1 ²⁷
29.4	21.02 ²⁴	29.4 ²³	33.06 ³	40.9 ¹	17.39 ⁴	72.8 ¹⁶	8.77 ³⁶	60.8 ²⁵
July 9.4	20.78 ²⁸	31.7 ¹⁹	33.03 ⁵	40.8 ²	17.35 ⁸	74.4 ¹³	8.41 ⁴³	63.1 ¹⁰
19.3	20.50 ³²	33.6 ¹⁴	32.98 ⁹	40.6 ²	17.27 ¹¹	75.7 ¹²	7.98 ⁴⁹	65.0 ¹⁴
29.3	20.18 ³⁶	35.0 ¹⁰	32.89 ¹²	40.4 ²	17.16 ¹³	76.9 ⁹	7.49 ⁵³	66.4 ¹⁰
Aug. 8.3	19.82 ³⁸	36.0 ⁴	32.77 ¹³	40.2 ³	17.03 ¹⁵	77.8 ⁶	6.96 ⁵⁷	67.4 ⁴
18.3	19.44 ⁴⁰	36.4 ¹	32.64 ¹⁵	39.9 ³	16.88 ¹⁷	78.4 ³	6.39 ⁵⁹	67.8 ¹
28.2	19.04 ⁴⁰	36.3 ⁵	32.49 ¹⁶	39.6 ⁴	16.71 ¹⁷	78.7 ⁰	5.80 ⁵⁹	67.7 ⁶
Sept. 7.2	18.64 ⁴⁰	35.8 ¹¹	32.33 ¹⁶	39.2 ⁴	16.54 ¹⁷	78.7 ³	5.21 ⁵⁸	67.1 ¹¹
17.2	18.24 ³⁷	34.7 ¹⁶	32.17 ¹⁴	38.8 ⁴	16.37 ¹⁶	78.4 ⁶	4.63 ⁵⁵	66.0 ¹⁶
27.2	17.87 ³⁴	33.1 ²⁰	32.03 ¹²	38.4 ⁴	16.21 ¹⁴	77.8 ¹⁰	4.08 ⁵¹	64.4 ²²
Oct. 7.1	17.53 ²⁹	31.1 ²⁵	31.91 ⁹	38.0 ³	16.07 ¹¹	76.8 ¹²	3.57 ⁴⁵	62.2 ²⁵
17.1	17.24 ²³	28.6 ²⁹	31.82 ⁴	37.6 ³	15.96 ⁷	75.6 ¹⁶	3.12 ³⁷	59.7 ²⁰
27.1	17.01 ¹⁷	25.7 ³²	31.78 ⁰	37.3 ²	15.89 ³	74.0 ¹⁸	2.75 ²⁸	56.8 ³⁵
Nov. 6.0	16.84 ⁹	22.5 ³⁵	31.78 ⁵	37.1 ⁰	15.86 ²	72.2 ²⁰	2.47 ¹⁸	53.5 ³⁵
16.0	16.75 ⁰	19.0 ³⁶	31.83 ¹⁰	37.1 ⁰	15.88 ⁶	70.2 ²³	2.29 ⁷	50.0 ³⁷
26.0	16.75 ⁸	15.4 ³⁷	31.93 ¹⁵	37.3 ²	15.94 ¹²	67.9 ²⁵	2.22 ¹⁶	46.3 ³⁸
Dec. 6.0	16.83 ¹⁶	11.7 ³⁷	32.08 ²¹	37.6 ⁵	16.06 ¹⁷	65.4 ²⁵	2.26 ¹⁶	42.5 ³⁷
15.9	16.99 ²⁵	8.0 ³⁶	32.29 ²⁵	38.1 ⁷	16.23 ²¹	62.9 ²⁶	2.42 ²⁷	38.8 ³⁶
25.9	17.24 ³¹	4.4 ³³	32.54 ²⁸	38.8 ⁹	16.44 ²⁵	60.3 ²⁵	2.69 ²⁷	35.2 ³³
35.9	17.55 ³¹	1.1 ³³	32.82 ²⁸	39.7 ⁹	16.69 ²⁵	57.8 ²⁵	3.06 ³⁷	31.9 ³³
Sec δ , Tan δ	1.930	+1.650	1.061	-0.356	1.047	+0.311	2.673	+2.479
Mean Place	17 ^h .734	31 ^m .11	29 ^h .473	24 ^m .98	14 ^h .227	80 ^m .89	5 ^h .165	62 ^m .01
D ψ α , D ω α	-0.04	+0.06	+0.01	-0.01	-0.01	+0.01	-0.06	+0.08
D ψ δ , D ω δ	-0.2	-0.9	-0.2	-0.9	-0.2	-0.9	-0.2	-0.9

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	ϕ Herculis. Mag. 4.3		δ^1 Apodis. Mag. 4.8		δ Ophiuchi. Mag. 3.0		σ Cor. Bor. seq. Mag. 5.8	
	Right Ascension.	Declination N.	Right Ascension.	Declination S.	Right Ascension.	Declination S.	Right Ascension.	Declination N.
	h m	s	h m	s	h m	s	h m	s
	16 6	+45 8	16 7	-78 28	16 9	-3 28	16 11	+34 3
n. 0.9	4.54	68.1	31.07	57.8	52.84	43.3	28.94	68.6
10.9	4.84	65.0	32.19	56.1	53.12	44.9	29.21	65.7
20.8	5.17	62.3	33.42	54.9	53.41	46.6	29.52	63.1
30.8	5.54	60.1	34.74	54.2	53.72	48.1	29.84	60.9
b. 9.8	5.92	58.4	36.10	54.0	54.04	49.4	30.18	59.2
19.8	6.30	57.3	37.49	54.3	54.36	50.6	30.53	58.0
ir. 1.7	6.68	56.8	38.86	55.1	54.67	51.5	30.87	57.3
11.7	7.05	57.0	40.19	56.4	54.97	52.2	31.20	57.3
21.7	7.39	57.8	41.46	58.0	55.26	52.5	31.51	57.8
31.6	7.71	59.1	42.65	60.0	55.52	52.6	31.79	58.8
r. 10.6	7.99	61.0	43.73	62.3	55.77	52.5	32.05	60.4
20.6	8.23	63.2	44.69	64.8	55.99	52.1	32.28	62.3
30.6	8.43	65.8	45.51	67.6	56.18	51.6	32.47	64.5
ly 10.5	8.58	68.6	46.18	70.6	56.35	50.9	32.62	67.0
20.5	8.68	71.6	46.68	73.6	56.49	50.1	32.74	69.6
30.5	8.74	74.6	47.02	76.6	56.60	49.2	32.82	72.2
ne 9.5	8.75	77.5	47.18	79.6	56.68	48.3	32.86	74.9
19.4	8.71	80.2	47.16	82.5	56.73	47.4	32.86	77.4
29.4	8.63	82.7	46.97	85.2	56.74	46.5	32.81	79.7
ly 9.4	8.50	84.9	46.60	87.6	56.72	45.7	32.73	81.8
19.3	8.34	86.8	46.08	89.6	56.67	45.0	32.62	83.5
29.3	8.14	88.3	45.42	91.3	56.59	44.3	32.47	85.0
ig. 8.3	7.91	89.4	44.65	92.5	56.48	43.7	32.30	86.1
18.3	7.66	90.0	43.79	93.3	56.35	43.2	32.10	86.8
28.2	7.39	90.1	42.87	93.5	56.20	42.9	31.89	87.0
pt. 7.2	7.12	89.8	41.94	93.1	56.05	42.6	31.67	86.9
17.2	6.85	89.0	41.03	92.2	55.90	42.5	31.46	86.4
27.2	6.59	87.7	40.19	90.8	55.75	42.6	31.25	85.4
t. 7.1	6.36	86.0	39.45	89.0	55.63	42.8	31.06	84.0
17.1	6.17	83.8	38.85	86.7	55.54	43.1	30.91	82.2
27.1	6.02	81.3	38.43	84.1	55.48	43.7	30.79	80.1
iv. 6.0	5.92	78.4	38.21	81.3	55.46	44.4	30.72	77.6
16.0	5.88	75.3	38.20	78.3	55.49	45.3	30.71	74.8
26.0	5.91	71.9	38.42	75.4	55.58	46.4	30.75	71.8
ic. 6.0	6.00	68.5	38.86	72.5	55.71	47.7	30.84	68.7
15.9	6.16	65.0	39.52	69.9	55.88	49.2	30.99	65.5
25.9	6.37	61.5	40.38	67.6	56.10	50.8	31.19	62.3
35.9	6.64	58.3	41.40	65.7	56.36	52.4	31.44	59.3
δ , Tan δ	1.418	+1.005	5.010	-4.909	1.002	-0.061	1.207	+0.676
n Place	5°.484	86''.16	36°.008	61''.45	53°.373	34''.40	29°.697	84''.81
α , $D_m \alpha$	-0.02	+0.03	+0.11	-0.16	0.00	0.00	-0.02	+0.02
δ , $D_m \delta$	-0.2	-0.9	-0.2	-0.9	-0.2	-0.9	-0.2	-0.9

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	19 Ursæ Minoris. Mag. 5.5		γ^2 Normæ. Mag. 4.1		ϵ Ophiuchi. Mag. 3.3		σ Scorpii. Mag. 3.1	
	Right Ascension.	Declination N.	Right Ascension.	Declination S.	Right Ascension.	Declination S.	Right Ascension.	Declination S.
	h m	° '	h m	° '	h m	° '	h m	° '
	16 13	+76 5	16 13	-49 56	16 13	-4 29	16 16	-25 23
	s	"	s	"	s	"	s	"
Jan. 0.9	9.90	10.9	27.09	53.1	48.78	18.7	0.47	27.6
10.9	10.48 ⁵⁸	7.8 ³¹	27.50 ⁴¹	52.5 ⁶	49.05 ²⁷	20.3 ¹⁶	0.78 ³¹	28.2 ⁶
20.8	11.18 ⁷⁰	5.1 ²⁷	27.94 ⁴⁴	52.3 ²	49.35 ³⁰	21.8 ¹⁵	1.11 ³³	28.9 ⁷
30.8	12.00 ⁸²	3.0 ²¹	28.40 ⁴⁶	52.3 ⁰	49.66 ³¹	23.3 ¹⁵	1.45 ³⁴	29.7 ⁸
Feb. 9.8	12.89 ⁸⁹	1.5 ¹⁵	28.88 ⁴⁸	52.7 ⁴	49.98 ³²	24.7 ¹⁴	1.80 ³⁵	30.6 ⁹
	94	9	48	6	32	11	36	10
19.8	13.83	0.6	29.36	53.3	50.30	25.8	2.16	31.6
Mar. 1.7	14.78 ⁹⁵	0.4 ²	29.83 ⁴⁷	54.2 ⁹	50.61 ³¹	26.7 ⁹	2.51 ³⁵	32.5 ⁹
11.7	15.70 ⁹²	0.9 ⁵	30.28 ⁴⁵	55.3 ¹¹	50.91 ³⁰	27.4 ⁷	2.84 ³³	33.4 ⁹
21.7	16.56 ⁸⁶	2.0 ¹¹	30.72 ⁴⁴	56.6 ¹³	51.20 ²⁹	27.7 ³	3.16 ³²	34.2 ⁸
31.7	17.34 ⁷⁸	3.7 ¹⁷	31.12 ⁴⁰	58.0 ¹⁴	51.47 ²⁷	27.8 ¹	3.46 ³⁰	35.0 ⁷
	68	23	38	16	25	1	28	7
Apr. 10.6	18.02	6.0	31.50	59.6	51.72	27.7	3.74	35.7
20.6	18.56 ⁵⁴	8.6 ²⁶	31.85 ³⁵	61.3 ¹⁷	51.94 ²²	27.4 ³	4.00 ²⁶	36.3 ⁶
30.6	18.96 ⁴⁰	11.6 ³⁰	32.15 ³⁰	63.1 ¹⁸	52.14 ²⁰	26.9 ⁵	4.23 ²³	36.9 ⁶
May 10.5	19.22 ²⁶	14.8 ³²	32.42 ²⁷	64.9 ¹⁸	52.31 ¹⁷	26.2 ⁷	4.43 ¹⁷	37.4 ⁵
20.5	19.31 ⁹	18.0 ³²	32.64 ¹⁶	66.7 ¹⁸	52.46 ¹⁵	25.4 ⁸	4.60 ¹⁴	37.8 ⁴
	6	33	16	18	12	8	14	4
30.5	19.25 ²²	21.3 ³¹	32.80 ¹²	68.5 ¹⁷	52.58 ⁸	24.6 ⁹	4.74 ¹⁰	38.2 ⁴
June 9.5	19.03 ³⁶	24.4 ³⁰	32.92 ⁷	70.2 ¹⁷	52.66 ⁵	23.7 ⁸	4.84 ⁶	38.6 ³
19.4	18.67 ⁴⁹	27.4 ²⁶	32.99 ¹	71.9 ¹⁵	52.71 ²	22.9 ⁸	4.90 ³	38.9 ²
29.4	18.18 ⁶²	30.0 ²³	33.00 ⁴	73.4 ¹³	52.73 ²	22.1 ⁸	4.93 ¹	39.1 ²
July 9.4	17.56 ⁷²	32.3 ¹⁹	32.96 ¹⁰	74.7 ¹¹	52.71 ⁵	21.3 ⁸	4.92 ⁵	39.3 ¹
19.4	16.84 ⁸¹	34.2 ¹⁴	32.86 ¹⁴	75.8 ⁹	52.66 ⁸	20.5 ⁶	4.87 ⁸	39.4 ⁰
29.3	16.03 ⁸⁹	35.6 ¹⁰	32.72 ¹⁸	76.7 ⁶	52.58 ¹⁰	19.9 ⁶	4.79 ¹²	39.4 ⁰
Aug. 8.3	15.14 ⁹³	37.1 ⁵	32.54 ²²	77.3 ³	52.48 ¹³	19.3 ⁴	4.67 ¹⁴	39.4 ¹
18.3	14.21 ⁹⁶	37.0 ¹	32.32 ²⁴	77.6 ¹	52.35 ¹⁵	18.9 ⁴	4.53 ¹⁶	39.3 ³
28.2	13.25 ⁹⁷	37.0 ⁶	32.08 ²⁵	77.5 ⁴	52.20 ¹⁵	18.5 ³	4.37 ¹⁶	39.0 ⁴
Sept. 7.2	12.28 ⁹⁶	36.4 ¹¹	31.83 ²⁴	77.1 ⁷	52.05 ¹⁶	18.2 ¹	4.21 ¹⁷	38.6 ⁴
17.2	11.32 ⁹¹	35.3 ¹⁶	31.59 ²³	76.4 ¹⁰	51.89 ¹⁴	18.1 ⁰	4.04 ¹⁶	38.2 ⁵
27.2	10.41 ⁸⁵	33.7 ²¹	31.36 ²⁰	75.4 ¹³	51.75 ¹²	18.1 ²	3.88 ¹³	37.7 ⁶
Oct. 7.1	9.56 ⁷⁶	31.6 ²⁵	31.16 ¹⁶	74.1 ¹⁵	51.63 ¹⁰	18.3 ³	3.75 ¹¹	37.1 ⁵
17.1	8.80 ⁶⁵	29.1 ²⁹	31.00 ¹⁰	72.6 ¹⁷	51.53 ⁶	18.6 ⁴	3.64 ⁶	36.6 ⁶
27.1	8.15 ⁵²	26.2 ³²	30.90 ³	70.9 ¹⁷	51.47 ²	19.0 ⁷	3.58 ²	36.0 ⁵
Nov. 6.1	7.63 ³⁷	23.0 ³⁵	30.87 ⁴	69.2 ¹⁸	51.45 ³	19.7 ⁹	3.56 ⁴	35.5 ⁴
16.0	7.26 ²¹	19.5 ³⁶	30.91 ¹²	67.4 ¹⁷	51.48 ⁸	20.6 ¹⁰	3.60 ⁹	35.1 ³
26.0	7.05 ³	15.2 ³⁷	31.03 ¹⁹	65.7 ¹⁵	51.56 ¹²	21.6 ¹²	3.69 ¹⁵	34.8 ⁰
Dec. 6.0	7.02 ¹⁵	8.5 ³⁵	31.22 ²⁵	64.2 ¹⁴	51.68 ¹⁸	22.8 ¹⁴	3.84 ²⁰	34.8 ¹
15.9	7.17 ³¹	5.0 ³³	31.47 ³³	62.8 ¹¹	51.86 ²²	24.2 ¹⁵	4.04 ²⁴	34.9 ²
25.9	7.48 ⁴⁸	1.7 ³³	31.80 ³⁸	61.7 ⁸	52.08 ²⁵	25.7 ¹⁵	4.28 ²⁹	35.1 ²
35.9	7.96		32.18	60.9	52.33	27.2 ¹⁵	4.57	35.6 ⁵
Sec δ , Tan δ	4.159	+4.037	1.554	-1.190	1.003	-0.079	1.107	-0.475
Mean Place	13 ^h .911	31 ^m .08	28 ^h .249	53 ^m .18	49 ^h .326	10 ^m .00	1 ^h .137	23 ^m .18
D ψ a , D ω a	-0.10	+0.12	+0.03	-0.04	0.00	0.00	+0.01	-0.01
D ψ δ , D ω δ	-0.2	-0.9	-0.2	-0.9	-0.2	-0.9	-0.2	-0.9

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	τ Herculis. Mag. 3.9		γ Herculis. Mag. 3.8		η Ursæ Minoris. Mag. 5.0		γ Apodis. Mag. 3.9	
	Right Ascension.	Declination N.	Right Ascension.	Declination N.	Right Ascension.	Declination N.	Right Ascension.	Declination S.
	^h ^m 16 17	[°] ['] +46 30	^h ^m 16 18	[°] ['] +19 20	^h ^m 16 19	[°] ['] +75 56	^h ^m 16 20	[°] ['] -78 42
Jan. 0.9	10.08	37.1	9.56	53.6	54.19	46.3	17.30	27.6
10.9	10.37 ²⁹	34.0 ³¹	9.82 ²⁶	51.1 ²⁵	54.74 ⁵⁵	43.2 ³¹	18.39 ¹⁰⁹	25.8 ¹⁸
20.8	10.70 ³³	31.2 ²⁸	10.10 ²⁸	48.8 ²³	55.43 ⁶⁹	40.4 ²⁸	19.62 ¹²³	24.4 ¹⁴
30.8	11.06 ³⁶	28.8 ²⁴	10.41 ³¹	46.8 ²⁰	56.22 ⁷⁹	38.2 ²²	20.94 ¹³²	23.5 ⁹
Feb. 9.8	11.44 ³⁸	27.1 ¹⁷	10.72 ³¹	45.1 ¹⁷	57.09 ⁸⁷	36.6 ¹⁶	22.32 ¹³⁸	23.1 ⁴
19.8	11.83 ³⁹	25.9 ¹²	11.04 ³²	43.9 ¹²	58.01 ⁹²	35.7 ⁹	23.72 ¹⁴⁰	23.2 ¹
Mar. 1.7	12.22 ³⁹	25.3 ⁶	11.36 ³²	43.1 ⁸	58.95 ⁹⁴	35.4 ³	25.13 ¹⁴¹	23.8 ⁶
11.7	12.60 ³⁸	25.4 ¹	11.66 ³⁰	42.8 ³	59.87 ⁹²	35.8 ⁴	26.51 ¹³⁸	24.8 ¹⁰
21.7	12.95 ³⁵	26.1 ⁷	11.95 ²⁹	42.9 ¹	60.73 ⁸⁶	36.8 ¹⁰	27.83 ¹³²	26.2 ¹⁴
31.7	13.28 ³³	27.4 ¹³	12.22 ²⁷	43.6 ⁷	61.52 ⁷⁹	38.5 ¹⁷	29.07 ¹²⁴	28.0 ¹⁸
Apr. 10.6	13.58 ³⁰	29.2 ¹⁸	12.47 ²⁵	44.6 ¹⁰	62.20 ⁶⁸	40.7 ²²	30.22 ¹¹⁵	30.2 ²²
20.6	13.83 ²⁵	31.5 ²³	12.69 ²²	46.0 ¹⁴	62.76 ⁵⁶	43.3 ²⁶	31.24 ¹⁰²	32.6 ²⁴
30.6	14.05 ²²	34.1 ²⁶	12.88 ¹⁹	47.6 ¹⁶	63.19 ⁴³	46.2 ²⁹	32.13 ⁸⁹	35.3 ²⁷
May 10.5	14.21 ¹⁶	36.9 ²⁸	13.05 ¹⁷	49.5 ¹⁹	63.46 ²⁷	49.4 ³²	32.87 ⁷⁴	38.1 ²⁸
20.5	14.33 ¹²	39.9 ³⁰	13.18 ¹³	51.5 ²⁰	63.58 ¹²	52.6 ³²	33.45 ⁵⁸	41.0 ²⁹
30.5	14.40 ⁷	42.9 ³⁰	13.28 ¹⁰	53.6 ²¹	63.54 ⁴	55.9 ³³	33.85 ⁴⁰	44.0 ³⁰
June 9.5	14.42 ²	45.9 ³⁰	13.35 ⁷	55.7 ²¹	63.35 ¹⁹	59.1 ³²	34.08 ²³	47.0 ³⁰
19.4	14.39 ³	48.7 ²⁸	13.38 ³	57.7 ²⁰	63.02 ³³	62.1 ³⁰	34.12 ⁴	49.9 ²⁹
29.4	14.31 ⁸	51.4 ²⁷	13.37 ¹	59.6 ¹⁹	62.55 ⁴⁷	64.8 ²⁷	33.97 ¹⁵	52.7 ²⁸
July 9.4	14.19 ¹²	53.7 ²³	13.33 ⁴	61.3 ¹⁷	61.96 ⁵⁹	67.2 ²⁴	33.65 ³²	55.2 ²⁵
19.4	14.03 ²¹	55.7 ¹⁶	13.26 ¹¹	62.8 ¹³	61.26 ⁷⁹	69.2 ¹⁶	33.16 ⁶⁴	57.3 ¹⁸
29.3	13.82 ²³	57.3 ¹²	13.15 ¹³	64.1 ¹⁰	60.47 ⁸⁷	70.8 ¹⁰	32.52 ⁷⁶	59.1 ¹⁴
Aug. 8.3	13.59 ²⁶	58.5 ⁷	13.02 ¹⁵	65.1 ⁷	59.60 ⁹²	71.8 ⁶	31.76 ⁸⁶	60.5 ⁹
18.3	13.33 ²⁸	59.2 ³	12.87 ¹⁷	65.8 ⁴	58.68 ⁹⁶	72.4 ⁰	30.90 ⁹³	61.4 ³
28.2	13.05 ²⁸	59.5 ²	12.70 ¹⁸	66.2 ¹	57.72 ⁹⁷	72.4 ⁴	29.97 ⁹⁶	61.7 ²
Sept. 7.2	12.77 ²⁹	59.3 ⁷	12.52 ¹⁸	66.3 ³	56.75 ⁹⁵	72.0 ¹⁰	29.01 ⁹⁴	61.5 ⁷
17.2	12.48 ²⁷	58.6 ¹²	12.34 ¹⁷	66.0 ⁶	55.80 ⁹¹	71.0 ¹⁵	28.07 ⁸⁹	60.8 ¹²
27.2	12.21 ²⁴	57.4 ¹⁶	12.17 ¹⁵	65.4 ⁹	54.89 ⁸⁶	69.5 ²⁰	27.18 ⁷⁹	59.6 ¹⁷
Oct. 7.1	11.97 ²²	55.8 ²⁰	12.02 ¹²	64.5 ¹⁶	54.03 ⁷⁸	67.5 ²⁴	26.39 ⁶⁶	57.9 ²²
17.1	11.75 ¹⁷	53.8 ²⁵	11.90 ⁹	63.3 ¹²	53.25 ⁶⁷	65.1 ²⁸	25.73 ⁴⁸	55.7 ²⁵
27.1	11.58 ¹¹	51.3 ²⁸	11.81 ⁵	61.7 ¹⁸	52.58 ⁵⁴	62.3 ³¹	25.25 ²⁹	53.2 ²⁸
Nov. 6.1	11.47 ⁶	48.5 ³¹	11.76 ⁰	59.9 ²¹	52.04 ³⁹	59.2 ³⁴	24.96 ⁷	50.4 ²⁹
16.0	11.41 ¹	45.4 ³⁴	11.76 ⁶	57.8 ²⁵	51.65 ²³	55.8 ³⁶	24.89 ¹⁶	47.5 ³⁰
26.0	11.42 ⁷	42.0 ³⁵	11.82 ¹⁰	55.4 ²⁴	51.42 ⁶	52.2 ³⁷	25.05 ³⁹	44.5 ²⁹
Dec. 6.0	11.49 ¹⁴	38.5 ³⁵	11.92 ¹⁵	52.9 ²⁶	51.36 ¹²	48.5 ³⁷	25.44 ⁶¹	41.6 ²⁷
15.9	11.63 ²⁰	35.0 ³⁵	12.07 ²⁰	50.3 ²⁶	51.48 ²⁹	44.8 ³⁶	26.05 ⁸²	38.9 ²⁵
25.9	11.83 ²⁵	31.5 ³³	12.27 ²⁴	47.7 ²⁶	51.77 ⁴⁵	41.2 ³³	26.87 ⁹⁹	36.4 ²⁰
35.9	12.08	28.2	12.51	45.1	52.22	37.9	27.86	34.4
Sec δ, Tan δ	1.453	+1.054	1.060	+0.351	4.119	+3.995	5.109	-5.010
Mean Place	11 ^h .149	54 ^m ''78	10 ^h .185	67 ^m ''03	58 ^h .320	65 ^m ''99	22 ^h .413	30 ^m ''41
D' ϕ α, D_u α	-0.03	+0.03	-0.01	+0.01	-0.10	+0.11	+0.12	-0.14
D' ϕ δ, D_u δ	-0.2	-0.9	-0.2	-0.9	-0.2	-0.9	-0.2	-0.9

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	ω Herculis. Mag. 4.5		η Draconis. Mag. 2.9		α Scorpi. (Antares.) Mag. 1.2		β Herculis Mag. 2.8	
	Right Ascension.	Declination N.	Right Ascension.	Declination N.	Right Ascension.	Declination S.	Right Ascension.	Declination S.
	h m 16 21	° ' " + 14 13	h m 16 22	° ' " + 61 41	h m 16 24	° ' " - 26 14	h m 16 26	° ' " +
Jan. 0.9	28.71 ^s	29.2 ["]	48.40 ^s	64.0 ["]	10.88 ^s	44.0 ["]	33.19 ^s	
10.9	28.97 ²⁶	26.9 ²³	48.74 ³⁴	60.8 ³²	11.18 ³⁰	44.4 ⁴	33.44 ²⁵	
20.9	29.25 ²⁸	24.7 ²²	49.15 ⁴¹	57.9 ²⁹	11.51 ³³	45.0 ⁶	33.72 ²⁸	
30.8	29.55 ³⁰	22.8 ¹⁹	49.61 ⁴⁶	55.5 ²⁴	11.85 ³⁴	45.8 ⁸	34.03 ³¹	
Feb. 9.8	29.86 ³¹	21.2 ¹⁶	50.11 ⁵⁰	53.8 ¹⁷	12.20 ³⁵	46.6 ⁸	34.34 ³¹	
19.8	30.18 ³²	19.9 ¹³	50.63 ⁵²	52.6 ¹²	12.56 ³⁶	47.5 ⁹	34.66 ³²	
Mar. 1.7	30.49 ³¹	19.1 ⁸	51.15 ⁵²	52.1 ⁵	12.91 ³⁵	48.3 ⁸	34.98 ³²	
11.7	30.79 ³⁰	18.7 ⁴	51.66 ⁵¹	52.4 ³	13.25 ³⁴	49.2 ⁹	35.29 ³¹	
21.7	31.08 ²⁹	18.8 ¹	52.14 ⁴⁸	53.2 ⁸	13.58 ³³	50.0 ⁸	35.58 ²⁹	
31.7	31.34 ²⁶	19.2 ⁴	52.58 ⁴⁴	54.7 ¹⁵	13.88 ³⁰	50.7 ⁷	35.86 ²⁸	
Apr. 10.6	31.59 ²⁵	20.0 ⁸	52.98 ⁴⁰	56.8 ²¹	14.17 ²⁹	51.3 ⁶	36.11 ²⁵	
20.6	31.82 ²³	21.2 ¹²	53.31 ³³	59.3 ²⁵	14.44 ²⁷	52.0 ⁷	36.34 ²³	
30.6	32.02 ²⁰	22.6 ¹⁴	53.58 ²⁷	62.1 ²⁸	14.68 ²⁴	52.5 ⁵	36.54 ²⁰	
May 10.5	32.18 ¹⁶	24.3 ¹⁷	53.78 ²⁰	65.2 ³¹	14.89 ²¹	53.0 ⁵	36.72 ¹⁸	
20.5	32.32 ¹⁴	26.1 ¹⁸	53.90 ¹²	68.4 ³²	15.07 ¹⁸	53.5 ⁵	36.86 ¹⁴	
30.5	32.43 ¹¹	27.9 ¹⁸	53.95 ⁵	71.7 ³³	15.21 ¹⁴	53.9 ⁴	36.96 ¹⁰	
June 9.5	32.50 ⁷	29.8 ¹⁹	53.92 ³	74.9 ³²	15.32 ¹¹	54.3 ⁴	37.03 ⁷	
19.4	32.54 ⁴	31.6 ¹⁸	53.82 ¹⁰	78.0 ³¹	15.40 ⁸	54.6 ³	37.07 ⁴	
29.4	32.55 ¹	33.3 ¹⁷	53.65 ¹⁷	80.8 ²⁸	15.43 ³	54.9 ²	37.06 ¹	
July 9.4	32.52 ⁶	34.9 ²³	53.42 ²³	83.3 ²⁵	15.42 ¹	55.1 ³	37.03 ³	
19.4	32.46 ¹⁰	36.2 ¹²	53.12 ³⁰	85.4 ²¹	15.38 ⁴	55.3 ²	36.95 ⁸	
29.3	32.36 ¹²	37.4 ¹⁰	52.77 ³⁵	87.1 ¹⁷	15.30 ⁸	55.4 ¹	36.85 ¹⁰	
Aug. 8.3	32.24 ¹²	38.4 ¹⁰	52.38 ³⁹	88.3 ¹²	15.19 ¹¹	55.4 ⁰	36.72 ¹³	
18.3	32.10 ¹⁴	39.0 ⁶	51.96 ⁴²	89.1 ⁸	15.05 ¹⁴	55.3 ¹	36.56 ¹⁶	
28.2	31.94 ¹⁶	39.4 ⁴	51.52 ⁴⁴	89.3 ²	14.89 ¹⁶	55.1 ²	36.38 ¹⁸	
Sept. 7.2	31.77 ¹⁷	39.6 ²	51.06 ⁴⁶	89.0 ³	14.72 ¹⁷	54.8 ³	36.20 ¹⁸	
17.2	31.60 ¹⁷	39.5 ¹	50.60 ⁴⁶	88.2 ⁸	14.55 ¹⁷	54.3 ⁵	36.01 ¹⁹	
27.2	31.43 ¹⁷	39.0 ⁵	50.17 ⁴³	86.9 ¹³	14.39 ¹⁶	53.8 ⁵	35.84 ¹⁷	
Oct. 7.1	31.29 ¹⁴	38.2 ⁸	49.76 ⁴¹	85.1 ¹⁸	14.25 ¹⁴	53.3 ⁵	35.68 ¹⁶	
17.1	31.17 ¹²	37.2 ¹⁰	49.40 ³⁶	82.8 ²³	14.14 ¹¹	52.7 ⁶	35.54 ¹⁴	
27.1	31.09 ⁸	35.9 ¹³	49.10 ³⁰	80.1 ²⁷	14.07 ⁷	52.1 ⁶	35.44 ¹⁰	
Nov. 6.1	31.05 ⁴	34.3 ¹⁶	48.87 ²³	77.1 ³⁰	14.05 ²	51.6 ⁵	35.38 ⁶	
16.0	31.05 ⁰	32.5 ¹⁸	48.72 ¹⁵	73.7 ³⁴	14.08 ³	51.1 ⁵	35.37 ¹	
26.0	31.10 ⁵	30.4 ²¹	48.65 ⁷	70.1 ³⁶	14.16 ⁸	50.8 ³	35.41 ⁴	
Dec. 6.0	31.21 ¹¹	28.2 ²²	48.68 ³	66.4 ³⁷	14.30 ¹⁴	50.6 ²	35.50 ⁹	
15.9	31.36 ¹⁵	25.8 ²⁴	48.80 ¹²	62.7 ³⁷	14.49 ¹⁹	50.6 ⁰	35.65 ¹⁵	
25.9	31.56 ²⁰	23.4 ²⁴	49.01 ²¹	59.1 ³⁶	14.72 ²³	50.8 ²	35.83 ¹⁸	
35.9	31.79 ²³	21.0 ²⁴	49.30 ²⁹	55.7 ³⁴	15.00 ²⁸	51.2 ⁴	36.06 ²³	
Sec δ , Tan δ Mean Place	1.032 29°.321	+0.253 41'".60	2.110 50°.274	+1.857 82'".83	1.115 11°.574	-0.493 39'".44	1.076 33°.876	
D' ψ α , D ₀ α	-0.01	+0.01	-0.04	+0.05	+0.01	-0.01	-0.01	
D' δ , D ₀ δ	-0.2	-0.9	-0.2	-0.9	-0.2	-0.9	-0.2	

[Eph 13]

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	λ Ophiuchi. Mag. 3.8		Δ Draconis. Mag. 5.0		τ Scorpii. Mag. 2.9		σ Herculis. Mag. 4.2	
	Right Ascension.	Declination N.	Right Ascension.	Declination N.	Right Ascension.	Declination S.	Right Ascension.	Declination N.
	h m 16 26	° ' " + 2 9	h m 16 28	° ' " + 68 56	h m 16 30	° ' " - 28 2	h m 16 31	° ' " + 42 36
1. 0.9	36.92	59.0	5.85	48.6	34.55	30.7	20.69	25.4
10.9	37.18 ²⁶	57.1 ¹⁹	6.25 ⁴⁰	45.3 ³³	34.85 ³⁰	31.1 ⁴	20.96 ²⁷	22.3 ³¹
20.9	37.46 ²⁸	55.3 ¹⁸	6.73 ⁴⁸	42.4 ²⁹	35.18 ³³	31.6 ⁵	21.26 ³⁰	19.5 ²⁸
30.8	37.76 ³⁰	53.7 ¹⁶	7.29 ⁵⁶	40.1 ²³	35.52 ³⁴	32.2 ⁶	21.60 ³⁴	17.1 ²⁴
4. 9.8	38.07 ³¹	52.3 ¹⁴	7.91 ⁶²	38.3 ¹⁸	35.88 ³⁶	32.9 ⁷	21.96 ³⁶	15.2 ¹⁹
19.8	38.38 ³¹	51.1 ¹²	8.55 ⁶⁴	37.1 ¹²	36.24 ³⁶	33.7 ⁸	22.32 ³⁶	13.9 ¹³
5. 1.7	38.69 ³¹	50.2 ⁹	9.21 ⁶⁶	36.7 ⁴	36.60 ³⁶	34.5 ⁸	22.69 ³⁷	13.2 ⁷
11.7	38.99 ³⁰	49.7 ⁵	9.86 ⁶⁵	36.9 ²	36.95 ³⁵	35.3 ⁸	23.05 ³⁶	13.1 ¹
21.7	39.28 ²⁹	49.5 ²	10.48 ⁶²	37.8 ⁹	37.28 ³³	36.0 ⁷	23.40 ³⁵	13.6 ⁵
31.7	39.55 ²⁷	49.6 ¹	11.05 ⁵⁷	39.3 ¹⁵	37.60 ³²	36.7 ⁷	23.72 ³²	14.7 ¹¹
10.6	39.80 ²⁵	50.0 ⁴	11.55 ⁵⁰	41.3 ²⁰	37.89 ²⁹	37.4 ⁷	24.02 ³⁰	16.3 ¹⁶
20.6	40.03 ²³	50.7 ⁷	11.97 ⁴²	43.8 ²⁵	38.16 ²⁷	38.1 ⁷	24.28 ²⁶	18.4 ²¹
30.6	40.24 ²¹	51.6 ⁹	12.31 ³⁴	46.7 ²⁹	38.41 ²⁵	38.7 ⁶	24.50 ²²	20.9 ²⁵
4. 10.6	40.42 ¹⁸	52.6 ¹⁰	12.55 ²⁴	49.9 ³²	38.63 ²²	39.2 ⁵	24.68 ¹⁸	23.6 ²⁷
20.5	40.57 ¹⁵	53.8 ¹²	12.68 ¹³	53.2 ³³	38.82 ¹⁹	39.8 ⁶	24.82 ¹⁴	26.5 ²⁹
30.5	40.69 ¹²	55.0 ¹²	12.72 ⁴	56.5 ³³	38.98 ¹⁶	40.3 ⁵	24.91 ⁹	29.5 ³⁰
5. 9.5	40.78 ⁹	56.3 ¹³	12.65 ⁷	59.7 ³²	39.10 ¹²	40.7 ⁴	24.96 ⁵	32.4 ²⁹
19.4	40.84 ⁶	57.5 ¹²	12.49 ¹⁶	62.8 ³¹	39.18 ⁸	41.2 ⁵	24.96 ⁰	35.3 ²⁹
29.4	40.86 ²	58.7 ¹²	12.23 ²⁶	65.7 ²⁹	39.22 ⁴	41.5 ³	24.91 ⁵	37.9 ²⁶
4. 9.4	40.85 ¹	59.8 ¹¹	11.88 ³⁵	68.2 ²⁵	39.22 ⁰	41.9 ⁴	24.82 ⁹	40.3 ²⁴
19.4	40.80 ⁵	60.8 ¹⁰	11.46 ⁴²	70.4 ²²	39.18 ⁴	42.1 ²	24.68 ¹⁴	42.4 ²¹
29.3	40.73 ⁷	61.7 ⁹	10.97 ⁴⁹	72.1 ¹⁷	39.10 ⁸	42.3 ²	24.51 ¹⁷	44.2 ¹⁸
5. 8.3	40.62 ¹¹	62.4 ⁷	10.43 ⁵⁴	73.3 ¹²	38.99 ¹¹	42.4 ¹	24.30 ²¹	45.5 ¹³
18.3	40.49 ¹³	63.0 ⁶	9.84 ⁵⁹	74.1 ⁸	38.85 ¹⁴	42.4 ⁰	24.07 ²³	46.4 ⁹
28.3	40.34 ¹⁵	63.4 ⁴	9.22 ⁶²	74.3 ²	38.69 ¹⁶	42.2 ²	23.82 ²⁵	46.9 ⁵
4. 7.2	40.18 ¹⁶	63.6 ²	8.59 ⁶³	74.0 ³	38.52 ¹⁷	42.2 ³	23.56 ²⁶	46.9 ⁰
17.2	40.03 ¹⁵	63.6 ⁰	7.96 ⁶³	73.2 ⁸	38.35 ¹⁷	41.9 ⁴	23.29 ²⁷	46.9 ⁵
27.2	39.88 ¹⁵	63.5 ¹	7.35 ⁶¹	71.9 ¹³	38.18 ¹⁷	41.5 ⁵	23.29 ²⁵	46.4 ¹⁰
7. 7.1	39.74 ¹⁴	63.2 ³	7.35 ⁵⁷	71.9 ¹⁸	38.18 ¹⁵	41.0 ⁶	23.04 ²⁵	45.4 ¹⁴
17.1	39.63 ¹¹	62.6 ⁶	6.78 ⁵¹	70.1 ²³	38.03 ¹¹	40.4 ⁶	22.80 ²⁴	44.0 ¹⁸
27.1	39.55 ⁸	61.8 ⁸	6.27 ⁴⁴	67.8 ²⁶	37.92 ⁸	39.8 ⁷	22.60 ¹⁷	42.2 ²²
4. 6.1	39.52 ³	61.8 ⁹	5.83 ³⁵	65.2 ³¹	37.84 ³	39.1 ⁶	22.43 ¹²	40.0 ²⁶
16.0	39.53 ¹	60.9 ¹²	5.48 ²⁵	62.1 ³⁴	37.81 ²	38.5 ⁵	22.31 ⁶	37.4 ²⁹
26.0	39.59 ⁶	59.7 ¹⁴	5.23 ¹⁴	58.7 ³⁶	37.83 ⁸	38.0 ⁵	22.25 ⁰	34.5 ³²
4. 6.0	39.70 ¹¹	58.3 ¹⁶	5.09 ²	55.1 ³⁷	37.91 ¹³	37.5 ³	22.25 ⁶	31.3 ³⁴
16.0	39.86 ²⁰	56.7 ¹⁷	5.07 ¹⁰	51.4 ³⁷	38.04 ¹⁹	37.2 ¹	22.31 ¹²	27.9 ³⁴
25.9	40.06 ²⁴	55.0 ¹⁸	5.17 ²²	47.7 ³⁷	38.23 ²³	37.1 ⁰	22.43 ¹⁸	24.5 ³⁴
35.9	40.30 ²⁴	53.2 ¹⁸	5.39 ³³	44.0 ³⁴	38.46 ²⁸	37.1 ³	22.61 ²³	21.1 ³⁴
		51.4 ¹⁸	5.72 ³³	40.6 ³⁴	38.74 ²⁸	37.4 ³	22.84 ²³	17.9 ³²
Tan δ	1.001	+0.038	2.784	+2.598	1.133	-0.533	1.359	+0.020
Place	37°.506	68''.98	8°.583	67''.41	35°.282	26''.34	21°.748	41''.87
D_{α}	0.00	0.00	-0.06	+0.07	+0.01	-0.01	-0.02	+0.02
D_{δ}	-0.2	-0.9	-0.2	-0.9	-0.2	-0.9	-0.2	-0.9

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	ζ Ophiuchi. Mag. 2.7		24 Scorpii. Mag. 5.0		ζ Herculis. Mag. 3.0		α Triang. Aust. Mag. 1.9	
	Right Ascension.	Declination S.	Right Ascension.	Declination S.	Right Ascension.	Declination N.	Right Ascension.	Declination S.
	h m 16 32	° ' " - 10 23	h m 16 36	° ' " - 17 34	h m 16 38	° ' " + 31 44	h m 16 39	° ' " - 68 52
Jan. 0.9	27.98 ²⁶	52.4 ¹³	38.63 ²⁷	49.0 ⁸	4.03 ²⁵	67.4 ²⁹	36.53 ⁶¹	22.9 ¹⁷
10.9	28.24 ²⁹	53.7 ¹²	38.90 ³⁰	49.8 ⁹	4.28 ²⁸	64.5 ²⁶	37.14 ⁶⁸	21.2 ¹³
20.9	28.53 ³¹	54.9 ¹²	39.20 ³²	50.7 ¹⁰	4.56 ³⁰	61.9 ²³	37.82 ⁷⁴	19.9 ⁹
30.8	28.84 ³²	56.1 ¹⁰	39.52 ³³	51.7 ⁹	4.86 ³³	59.6 ¹⁹	38.56 ⁷⁸	19.0 ⁵
Feb. 9.8	29.16 ³²	57.3 ¹²	39.85 ³³	52.6 ⁹	5.19 ³³	57.7 ¹³	39.34 ⁷⁹	18.5 ⁰
19.8	29.48 ³²	58.3 ⁸	40.18 ³³	53.5 ⁸	5.52 ³³	56.4 ⁹	40.13 ⁸⁰	18.5 ³
Mar. 1.8	29.80 ³²	59.1 ⁷	40.51 ³³	54.3 ⁷	5.85 ³³	55.5 ²	40.93 ⁷⁹	18.8 ⁷
11.7	30.12 ³⁰	59.8 ⁴	40.84 ³¹	55.0 ⁵	6.18 ³¹	55.3 ³	41.72 ⁷⁷	19.5 ¹¹
21.7	30.42 ²⁸	60.2 ²	41.15 ²⁹	55.5 ⁴	6.49 ³⁰	55.6 ⁹	42.49 ⁷³	20.6 ¹⁴
31.7	30.70 ²⁶	60.4 ¹	41.44 ²⁸	55.9 ³	6.79 ²⁷	56.5 ¹³	43.22 ⁶⁸	22.0 ¹⁷
Apr. 10.6	30.96 ²⁵	60.5 ¹	41.72 ²⁶	56.2 ²	7.06 ²⁴	57.8 ¹⁸	43.90 ⁶²	23.7 ²⁰
20.6	31.21 ²²	60.4 ³	41.98 ²³	56.4 ⁰	7.30 ²²	59.6 ²¹	44.52 ⁵⁶	25.7 ²²
30.6	31.43 ²⁰	60.1 ⁴	42.21 ²¹	56.4 ⁰	7.52 ¹⁸	61.7 ²⁴	45.08 ⁴⁹	27.9 ²⁴
May 10.6	31.63 ¹⁷	59.7 ⁵	42.42 ¹⁸	56.4 ¹	7.70 ¹⁵	64.1 ²⁶	45.57 ⁴⁰	30.3 ²⁵
20.5	31.80 ¹³	59.2 ⁶	42.60 ¹⁵	56.3 ²	7.85 ¹¹	66.7 ²⁶	45.97 ³¹	32.8 ²⁶
30.5	31.93 ¹¹	58.6 ⁶	42.75 ¹²	56.1 ¹	7.96 ⁷	69.3 ²⁷	46.28 ²²	35.4 ²⁵
June 9.5	32.04 ⁷	58.0 ⁵	42.87 ⁸	56.0 ²	8.03 ³	72.0 ²⁶	46.50 ¹²	37.9 ²⁶
19.5	32.11 ⁴	57.5 ⁶	42.95 ⁴	55.8 ²	8.06 ²	74.6 ²⁴	46.62 ¹	40.5 ²⁴
29.4	32.15 ¹	56.9 ⁶	42.99 ¹	55.6 ²	8.04 ⁵	77.0 ²²	46.63 ⁸	42.9 ²²
July 9.4	32.14 ³	56.3 ⁵	43.00 ³	55.4 ²	7.99 ⁹	79.2 ²⁰	46.55 ¹⁸	45.1 ²⁰
19.4	32.11 ⁷	55.8 ⁴	42.97 ⁷	55.2 ²	7.90 ¹²	81.2 ¹⁷	46.37 ²⁷	47.1 ¹⁷
29.3	32.04 ¹⁰	55.4 ⁴	42.90 ¹⁰	55.0 ²	7.78 ¹⁶	82.9 ¹³	46.10 ³⁶	48.8 ¹³
Aug. 8.3	31.94 ¹²	55.0 ⁴	42.80 ¹³	54.8 ³	7.62 ¹⁸	84.2 ⁹	45.74 ⁴¹	50.1 ⁹
18.3	31.82 ¹⁵	54.6 ⁴	42.67 ¹⁴	54.5 ²	7.44 ²⁰	85.1 ⁶	45.33 ⁴⁶	51.0 ⁵
28.3	31.67 ¹⁵	54.2 ³	42.53 ¹⁶	54.3 ³	7.24 ²²	85.7 ¹	44.87 ⁴⁹	51.5 ⁰
Sept. 7.2	31.52 ¹⁶	53.9 ²	42.37 ¹⁶	54.0 ³	7.02 ²²	85.8 ²	44.38 ⁵⁰	51.5 ⁵
17.2	31.36 ¹⁵	53.7 ¹	42.21 ¹⁶	53.7 ³	6.80 ²¹	85.6 ⁷	43.88 ⁴⁷	51.0 ¹⁰
27.2	31.21 ¹³	53.6 ¹	42.05 ¹⁴	53.4 ²	6.59 ¹⁹	84.9 ¹¹	43.41 ⁴³	50.0 ¹⁴
Oct. 7.1	31.08 ¹¹	53.5 ¹	41.91 ¹¹	53.2 ³	6.40 ¹⁷	83.8 ¹⁴	42.98 ³⁶	48.6 ¹⁸
17.1	30.97 ⁸	53.6 ²	41.80 ⁸	52.9 ¹	6.23 ¹⁴	82.4 ¹⁹	42.62 ²⁷	46.8 ²¹
27.1	30.89 ³	53.8 ³	41.72 ⁴	52.8 ¹	6.09 ⁹	80.5 ²²	42.35 ¹⁷	44.6 ²⁴
Nov. 6.1	30.86 ¹	54.1 ⁴	41.68 ²	52.7 ¹	6.00 ⁴	78.3 ²⁵	42.18 ⁵	42.2 ²⁵
16.0	30.87 ⁷	54.5 ⁸	41.70 ⁶	52.8 ²	5.96 ¹	75.8 ²⁸	42.13 ⁷	39.7 ²⁶
26.0	30.94 ¹¹	55.2 ⁷	41.76 ¹²	53.0 ³	5.97 ¹²	73.0 ³⁰	42.20 ²¹	37.1 ²⁵
Dec. 6.0	31.05 ¹⁷	56.0 ⁹	41.88 ¹⁷	53.3 ⁵	6.04 ¹²	70.0 ³⁰	42.41 ³³	34.5 ²⁵
16.0	31.22 ²⁰	56.9 ¹¹	42.05 ²¹	53.8 ⁶	6.16 ¹⁷	67.0 ³¹	42.74 ⁴⁵	32.0 ²²
25.9	31.42 ²⁵	58.0 ¹²	42.26 ²⁵	54.4 ⁸	6.33 ²²	63.9 ³⁰	43.19 ⁵⁵	29.8 ¹⁹
35.9	31.67 ²⁵	59.2 ¹²	42.51 ²⁵	55.2 ⁸	6.55 ²²	60.9 ³⁰	43.74 ⁵⁵	27.9 ¹⁹
Sec δ, Tan δ	1.017	-0.184	1.040	-0.317	1.176	+0.619	2.775	-2.588
Mean Place	28°.593	44''.78	39°.286	42''.54	4°.895	82''.12	39°.107	23''.62
D'ψ α, Dω α	0.00	0.00	+0.01	-0.01	-0.02	+0.01	+0.06	-0.06
Dψ δ, Dω δ	-0.1	-0.9	-0.1	-0.9	-0.1	-0.9	-0.1	-0.9

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	77 Herculis. Mag. 3.6		Groombridge 2377. Mag. 4.9		ε Scorpii. Mag. 2.4		49 Herculis. Mag. 6.4	
	Right Ascension.	Declination N.	Right Ascension.	Declination N.	Right Ascension.	Declination S.	Right Ascension.	Declination N.
	h m 16 39	° ' " + 39 4	h m 16 43	° ' " + 56 55	h m 16 44	° ' " - 34 8	h m 16 48	° ' " + 15 6
	s 57.85	" 44.1	s 39.33	" 43.4	s 38.43	" 28.2	s 11.91	" 45.6
n. 0.9	57.85 ²⁵	44.1 ³¹	39.33 ²⁸	43.4 ³³	38.43 ³⁰	28.2 ¹	11.91 ²³	45.6 ²⁴
10.9	58.10 ²⁹	41.0 ²⁸	39.61 ³⁵	40.1 ³⁰	38.73 ³³	28.1 ¹	12.14 ²⁷	43.2 ²²
20.9	58.39 ³²	38.2 ²⁴	39.96 ³⁹	37.1 ²⁶	39.06 ³⁶	28.2 ¹	12.41 ²⁸	41.0 ²⁰
30.8	58.71 ³⁴	35.8 ²⁰	40.35 ⁴³	34.5 ¹⁴	39.42 ³⁷	28.5 ⁴	12.69 ³¹	39.0 ¹³
b. 9.8	59.05 ³⁶	33.8 ¹⁴	40.78 ⁴⁵	32.5 ¹⁴	39.79 ³⁸	28.9 ⁵	13.00 ³¹	37.4 ¹³
19.8	59.41 ³⁵	32.4 ⁸	41.23 ⁴⁶	31.1 ⁷	40.17 ³⁸	29.4 ⁶	13.31 ³¹	36.1 ⁹
r. 1.8	59.76 ³⁵	31.6 ²	41.69 ⁴⁶	30.4 ¹	40.55 ³⁸	30.0 ⁷	13.62 ³⁰	35.2 ⁵
11.7	60.11 ³⁵	31.4 ⁴	42.15 ⁴⁶	30.3 ⁶	40.92 ³⁷	30.7 ⁸	13.92 ³⁰	34.7 ⁰
21.7	60.45 ³⁴	31.8 ¹⁰	42.59 ⁴⁴	30.9 ¹²	41.28 ³⁶	31.4 ⁸	14.22 ²⁸	34.7 ⁵
31.7	60.76 ²⁹	32.8 ¹⁵	43.01 ³⁷	32.1 ¹⁸	41.62 ³²	32.2 ⁸	14.50 ²⁶	35.2 ⁸
r. 10.6	61.05 ²⁶	34.3 ²⁰	43.38 ³³	33.9 ²³	41.94 ³⁰	33.0 ⁷	14.76 ²⁴	36.0 ¹²
20.6	61.31 ²³	36.3 ²³	43.71 ²⁸	36.2 ²⁷	42.24 ²⁸	33.7 ⁸	15.00 ²²	37.2 ¹⁵
30.6	61.54 ¹⁹	38.6 ²⁶	43.99 ²²	38.9 ³⁰	42.52 ²⁵	34.5 ⁸	15.22 ²⁰	38.7 ¹⁷
y 10.6	61.73 ¹⁵	41.2 ²⁸	44.21 ¹⁶	41.9 ³²	42.77 ²¹	35.3 ⁸	15.42 ¹⁶	40.4 ¹⁹
20.5	61.88 ¹⁰	44.0 ²⁹	44.37 ⁹	45.1 ³³	42.98 ¹⁸	36.1 ⁸	15.58 ¹³	42.3 ²⁰
30.5	61.98 ⁶	46.9 ²⁹	44.46 ³	48.4 ³²	43.16 ¹⁴	36.9 ⁸	15.71 ¹⁰	44.3 ²⁰
ae 9.5	62.04 ²	49.8 ²⁸	44.49 ⁴	51.6 ³¹	43.30 ¹⁰	37.7 ⁸	15.81 ⁶	46.3 ¹⁹
19.5	62.06 ³	52.6 ²⁶	44.45 ¹⁰	54.7 ³⁰	43.40 ⁵	38.5 ⁷	15.87 ³	48.2 ¹⁹
29.4	62.03 ⁷	55.2 ²⁴	44.35 ¹⁶	57.7 ²⁷	43.45 ¹	39.2 ⁷	15.90 ¹	50.1 ¹⁷
y 9.4	61.96 ¹¹	57.6 ²¹	44.19 ²²	60.4 ²³	43.46 ³	39.9 ⁶	15.89 ⁵	51.8 ¹⁶
19.4	61.85 ¹⁵	59.7 ¹⁸	43.97 ²⁶	62.7 ²⁰	43.43 ⁸	40.5 ⁴	15.84 ⁸	53.4 ¹³
29.3	61.70 ¹⁸	61.5 ¹⁴	43.71 ³¹	64.7 ¹⁵	43.35 ¹¹	40.9 ³	15.76 ¹¹	54.7 ¹¹
g. 8.3	61.52 ²²	62.9 ¹⁰	43.40 ³⁵	66.2 ¹¹	43.24 ¹⁵	41.2 ⁰	15.65 ¹⁴	55.8 ⁸
18.3	61.30 ²³	63.9 ¹⁶	43.05 ³⁸	67.3 ⁵	43.09 ¹⁷	41.4 ⁰	15.51 ¹⁶	56.6 ⁶
28.3	61.07 ²⁴	64.5 ¹	42.67 ³⁹	67.8 ¹	42.92 ¹⁹	41.4 ²	15.35 ¹⁷	57.2 ³
st. 7.2	60.83 ²⁵	64.6 ⁴	42.28 ³⁹	67.9 ⁵	42.73 ¹⁹	41.2 ³	15.18 ¹⁸	57.5 ⁰
17.2	60.58 ²⁴	64.2 ⁸	41.89 ³⁸	67.4 ¹⁰	42.54 ¹⁸	40.9 ⁵	15.00 ¹⁷	57.5 ³
27.2	60.34 ²²	63.4 ¹²	41.51 ³⁶	66.4 ¹⁴	42.36 ¹⁷	40.4 ⁷	14.83 ¹⁶	57.2 ⁷
7.2	60.12 ²⁰	62.2 ¹⁶	41.15 ³²	65.0 ²⁰	42.19 ¹⁴	39.7 ⁸	14.67 ¹⁴	56.5 ⁹
17.1	59.92 ¹⁶	60.6 ²¹	40.83 ²⁸	63.0 ²⁴	42.05 ¹⁰	38.9 ⁹	14.53 ¹¹	55.6 ¹²
27.1	59.76 ¹¹	58.5 ²⁵	40.55 ²²	60.6 ²⁸	41.95 ⁵	38.0 ⁹	14.42 ⁶	54.4 ¹⁵
v. 6.1	59.65 ⁶	56.0 ²⁷	40.33 ¹⁵	57.8 ³¹	41.90 ¹	37.1 ⁹	14.36 ²	52.9 ¹⁸
16.0	59.59 ¹	53.3 ³¹	40.18 ⁸	54.7 ³⁴	41.91 ⁶	36.2 ⁸	14.34 ²	51.1 ²⁰
26.0	59.58 ⁶	50.2 ³²	40.10 ¹	51.3 ³⁶	41.97 ¹²	35.4 ⁷	14.36 ⁸	49.1 ²²
z. 6.0	59.64 ¹¹	47.0 ³³	40.11 ⁸	47.7 ³⁶	42.09 ¹⁹	34.7 ⁶	14.44 ¹³	46.9 ²³
16.0	59.75 ¹⁷	43.7 ³³	40.19 ¹⁷	44.1 ³⁷	42.28 ²³	34.1 ⁴	14.57 ¹⁷	44.6 ²⁴
25.9	59.92 ²²	40.4 ³²	40.36 ²⁴	40.4 ³⁵	42.51 ²⁸	33.7 ²	14.74 ²¹	42.2 ²⁴
35.9	60.14 ²²	37.2 ³²	40.60 ²⁴	36.9 ³⁵	42.79 ²⁸	33.5 ²	14.95 ²¹	39.8 ²⁴
Tan δ	1.288	+0.812	1.833	+1.536	1.208	-0.678	1.036	+0.270
Place	58°.872	59''.66	41°.071	60''.48	39°.268	24''.25	12°.623	57''.46
D _∞ α	-0.02	+0.02	-0.04	+0.03	+0.02	-0.01	-0.01	+0.01
D _∞ δ	-0.1	-0.9	-0.1	-0.9	-0.1	-0.9	-0.1	-1.0

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	ε ¹ Aræ. Mag. 4.2		κ Ophiuchi. Mag. 3.4		30 Ophiuchi. Mag. 5.0		ε Herculis. Mag. 3.9	
	Right Ascension.	Declination S.	Right Ascension.	Declination N.	Right Ascension.	Declination S.	Right Ascension.	Declination N.
	h m	° '	h m	° '	h m	° '	h m	° '
	16 52	— 53 1	16 53	+ 9 30	16 56	— 4 5	16 57	+ 31 2
Jan. 0.9	46.85	54.1	37.94	11.9	34.01	54.3	1.27	49.4
10.9	47.24 ³⁹	53.0 ¹¹	38.18 ²⁴	9.8 ²¹	34.25 ²⁴	55.8 ¹⁵	1.50 ²³	46.5 ²⁹
20.9	47.67 ⁴³	52.1 ⁹	38.44 ²⁶	7.8 ²⁰	34.52 ²⁷	57.2 ¹⁴	1.77 ²⁷	43.8 ²⁷
30.8	48.13 ⁴⁶	51.6 ⁵	38.72 ²⁸	6.0 ¹⁸	34.80 ²⁸	58.6 ¹⁴	2.06 ²⁹	41.4 ²⁴
Feb. 9.8	48.62 ⁴⁹	51.3 ³	39.02 ³⁰	4.5 ¹⁵	35.11 ³¹	59.8 ¹²	2.37 ³¹	39.5 ¹⁹
	50	1	30	13	31	10	33	15
19.8	49.12	51.4	39.32	3.2	35.42	60.8	2.70	38.0
Mar. 1.8	49.62 ⁵⁰	51.7 ³	39.63 ³¹	2.4 ⁸	35.73 ³¹	61.5 ⁷	3.03 ³³	37.1 ⁹
11.7	50.12 ⁵⁰	52.3 ⁶	39.93 ³⁰	1.9 ⁵	36.04 ³¹	62.1 ⁶	3.35 ³²	36.7 ⁴
21.7	50.61 ⁴⁹	53.1 ⁸	40.23 ³⁰	1.8 ¹	36.34 ³⁰	62.3 ²	3.67 ³²	36.9 ²
31.7	51.07 ⁴⁶	54.1 ¹⁰	40.51 ²⁸	2.1 ³	36.62 ²⁸	62.3 ⁰	3.98 ³¹	37.6 ⁷
	44	12	26	7	27	2	28	12
Apr. 10.7	51.51	55.3	40.77	2.8	36.89	62.1	4.26	38.8
20.6	51.92 ⁴¹	56.6 ¹³	41.02 ²⁵	3.8 ¹⁰	37.15 ²⁶	61.6 ⁵	4.52 ²⁶	40.5 ¹⁷
30.6	52.30 ³⁸	58.2 ¹⁶	41.24 ²²	5.0 ¹²	37.38 ²³	60.9 ⁷	4.75 ²³	42.6 ²¹
May 10.6	52.64 ³⁴	59.8 ¹⁶	41.44 ²⁰	6.5 ¹⁵	37.59 ²¹	60.1 ⁸	4.95 ²⁰	44.9 ²³
20.5	52.93 ²⁹	61.5 ¹⁷	41.61 ¹⁷	8.1 ¹⁶	37.78 ¹⁹	59.1 ¹⁰	5.12 ¹⁷	47.4 ²⁵
	24	18	14	17	15	10	13	27
30.5	53.17	63.3	41.75	9.8	37.93	58.1	5.25	50.1
June 9.5	53.35 ¹⁸	65.1 ¹⁸	41.86 ¹¹	11.6 ¹⁸	38.05 ¹²	57.1 ¹⁰	5.34 ⁹	52.8 ²⁷
19.5	53.48 ¹³	66.9 ¹⁸	41.93 ⁷	13.3 ¹⁷	38.14 ⁹	56.1 ¹⁰	5.39 ⁵	55.4 ²⁶
29.4	53.54 ⁶	68.6 ¹⁷	41.97 ⁴	14.9 ¹⁶	38.20 ⁶	55.2 ⁹	5.40 ¹	57.9 ²⁵
July 9.4	53.54 ⁰	70.2 ¹⁶	41.97 ⁰	16.4 ¹⁵	38.21 ¹	54.3 ⁸	5.37 ³	60.2 ²³
	6	14	4	14	2	8	7	21
19.4	53.48	71.6	41.93	17.8	38.19	53.5	5.30	62.3
29.4	53.37 ¹¹	72.9 ¹³	41.86 ⁷	19.0 ¹²	38.13 ⁶	52.7 ⁸	5.19 ¹¹	64.1 ¹⁸
Aug. 8.3	53.20 ¹⁷	73.9 ¹⁰	41.76 ¹⁰	20.0 ¹⁰	38.04 ⁹	52.1 ⁶	5.04 ¹⁵	65.6 ¹⁵
18.3	52.98 ²²	74.5 ⁶	41.63 ¹³	20.8 ⁸	37.92 ¹²	51.6 ⁵	4.87 ¹⁷	66.7 ¹¹
28.3	52.74 ²⁴	74.9 ⁴	41.48 ¹⁵	21.3 ⁵	37.78 ¹⁴	51.2 ⁴	4.67 ²⁰	67.4 ⁷
	27	0	17	3	15	3	21	4
Sept. 7.2	52.47	74.9	41.31	21.6	37.63	50.9	4.46	67.8
17.2	52.19 ²⁸	74.6 ³	41.14 ¹⁷	21.7 ¹	37.47 ¹⁶	50.8 ¹	4.24 ²²	67.7 ¹
27.2	51.92 ²⁷	73.9 ⁷	40.98 ¹⁶	21.5 ²	37.31 ¹⁶	50.8 ⁰	4.03 ²¹	67.2 ⁵
Oct. 7.2	51.67 ²⁵	72.8 ¹¹	40.82 ¹⁶	21.0 ⁵	37.16 ¹⁵	50.9 ¹	3.83 ²⁰	66.3 ⁹
17.1	51.46 ²¹	71.5 ¹³	40.68 ¹⁴	20.3 ⁷	37.04 ¹²	51.1 ²	3.65 ¹⁸	65.0 ¹³
	16	16	10	10	10	5	15	17
27.1	51.30	69.9	40.58	19.3	36.94	51.6	3.50	63.3
Nov. 6.1	51.21 ⁹	68.2 ¹⁷	40.52 ⁶	18.1 ¹²	36.89 ⁵	52.2 ⁶	3.39 ¹¹	61.2 ²¹
16.1	51.19 ²	66.4 ¹⁸	40.50 ²	16.6 ¹⁵	36.88 ¹	52.9 ⁷	3.34 ⁵	58.8 ²⁴
26.0	51.25 ⁶	64.5 ¹⁹	40.53 ³	14.9 ¹⁷	36.92 ⁴	53.9 ¹⁰	3.33 ¹	56.2 ²⁶
Dec. 6.0	51.38 ¹³	62.6 ¹⁹	40.60 ⁷	13.0 ¹⁹	37.00 ⁸	55.0 ¹¹	3.38 ⁵	53.3 ²⁹
	22	17	13	20	14	12	10	30
16.0	51.60	60.9	40.73	11.0	37.14	56.2	3.48	50.3
25.9	51.88 ²⁸	59.4 ¹⁵	40.89 ¹⁶	8.9 ²¹	37.31 ¹⁷	57.6 ¹⁴	3.63 ¹⁵	47.3 ³⁰
35.9	52.23 ³⁵	58.1 ¹³	41.10 ²¹	6.8 ²¹	37.53 ²²	59.0 ¹⁴	3.83 ²⁰	44.3 ³⁰
Sec δ, Tan δ	1.663	-1.329	1.014	+0.167	1.003	-0.072	1.167	+0.602
Mean Place	48 ²⁰ .206	52 ¹¹ .35	38 ²⁸ .638	22 ¹¹ .86	34 ²⁸ .673	45 ¹¹ .47	29 ²⁰ .216	63 ¹¹ .13
Dψ α, Dω α	+0.03	-0.03	0.00	0.00	0.00	0.00	-0.02	+0.01
Dψ δ, Dω δ	-0.1	-1.0	-0.1	-1.0	-0.1	-1.0	-0.1	-1.0

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	<i>d</i> Herculis. Mag. 5.3		<i>η</i> Ophiuchi. Mag. 2.6		<i>η</i> Scorpii. Mag. 3.4		<i>ζ</i> Draconis. Mag. 3.2	
	Right Ascension.	Declination N.	Right Ascension.	Declination S.	Right Ascension.	Declination S.	Right Ascension.	Declination N.
	h m 16 58	° ' +33 40	h m 17 5	° ' -15 37	h m 17 6	° ' -43 7	h m 17 8	° ' +65 48
	s 27.00	" 72.2	s 29.37	" 21.2	s 2.69	" 45.8	s 29.50	" 53.6
III. 0.9	27.22 ²²	69.2 ³⁰	29.61 ²⁴	22.0 ⁸	3.00 ³¹	45.1 ⁷	29.78 ²⁸	50.1 ³⁵
10.9	27.49 ²⁷	66.4 ²⁸	29.89 ²⁸	22.9 ⁹	3.36 ³⁶	44.6 ⁵	30.15 ³⁷	47.0 ³¹
20.9	27.78 ²⁹	64.0 ²⁴	30.19 ³⁰	23.7 ⁸	3.74 ³⁸	44.3 ³	30.59 ⁴⁴	44.2 ²⁸
30.9	28.10 ³²	62.0 ²⁰	30.50 ³¹	24.5 ⁸	4.15 ⁴¹	44.2 ¹	31.09 ⁵⁰	42.0 ²²
ib. 9.8	28.33 ³³	60.5 ¹⁵	30.83 ³³	25.2 ⁷	4.57 ⁴²	44.3 ¹	31.64 ⁵⁵	40.4 ¹⁶
19.8	28.77 ³⁴	59.6 ⁹	31.15 ³²	25.8 ⁶	4.99 ⁴²	44.6 ³	32.21 ⁵⁷	39.4 ¹⁰
ar. 1.8	29.10 ³³	59.2 ⁴	31.47 ³²	26.3 ⁵	5.41 ⁴²	45.0 ⁴	32.79 ⁵⁸	39.1 ³
11.7	29.42 ³²	59.4 ²	31.79 ³²	26.7 ²	5.82 ⁴¹	45.5 ⁵	33.37 ⁵⁸	39.5 ⁴
21.7	29.73 ³¹	60.2 ⁸	32.09 ³⁰	26.9 ⁴	6.22 ⁴⁰	46.2 ⁷	33.91 ⁵⁴	40.5 ¹⁰
31.7	30.02 ²⁹	61.5 ¹³	32.38 ²⁹	26.9 ⁰	6.60 ³⁸	47.0 ⁸	34.41 ⁵⁰	42.2 ¹⁷
pr. 10.7	30.29 ²⁷	63.2 ¹⁷	32.66 ²⁸	26.8 ¹	6.96 ³⁶	47.9 ⁹	34.86 ⁴⁵	44.4 ²²
20.6	30.53 ²⁴	65.3 ²¹	32.91 ²⁵	26.6 ²	7.29 ³³	48.9 ¹⁰	35.24 ³⁸	47.0 ²⁶
30.6	30.73 ²⁰	67.7 ²⁴	33.14 ²³	26.4 ²	7.59 ³⁰	50.0 ¹¹	35.55 ³¹	49.9 ²⁹
ay 10.6	30.90 ¹⁷	70.4 ²⁷	33.35 ²¹	26.0 ⁴	7.85 ²⁶	51.2 ¹²	35.77 ²²	53.1 ³²
20.6	31.03 ¹³	73.1 ²⁷	33.52 ¹⁷	25.6 ⁴	8.08 ²³	52.4 ¹²	35.91 ¹⁴	56.5 ³⁴
30.5	31.12 ⁹	75.9 ²⁸	33.67 ¹⁵	25.3 ³	8.26 ¹⁸	53.6 ¹²	35.95 ⁴	59.9 ³⁴
ine 9.5	31.17 ⁵	78.6 ²⁷	33.77 ¹⁰	24.9 ⁴	8.39 ¹³	54.9 ¹³	35.91 ⁴	63.2 ³³
19.5	31.17 ⁰	81.2 ²⁶	33.84 ⁷	24.5 ⁴	8.47 ⁸	56.1 ¹²	35.78 ¹³	66.3 ³¹
29.4	31.13 ⁴	83.6 ²⁴	33.87 ³	24.2 ³	8.50 ³	57.2 ¹¹	35.56 ²²	69.3 ³⁰
ily 9.4	31.06 ⁷	85.8 ²²	33.86 ¹	23.9 ³	8.48 ²	58.3 ¹¹	35.27 ²⁹	71.9 ²⁶
19.4	30.94 ¹²	87.6 ¹⁸	33.81 ⁵	23.6 ³	8.41 ⁷	59.2 ⁹	34.90 ³⁷	74.1 ²²
29.4	30.78 ¹⁶	89.2 ¹⁶	33.72 ⁹	23.4 ²	8.29 ¹²	59.9 ⁷	34.47 ⁴³	75.9 ¹⁸
ug. 8.3	30.60 ¹⁸	90.3 ¹¹	33.61 ¹¹	23.1 ³	8.13 ¹⁶	60.4 ⁵	33.99 ⁴⁸	77.3 ¹⁴
18.3	30.40 ²⁰	91.1 ⁸	33.47 ¹⁴	22.9 ²	7.94 ¹⁹	60.7 ³	33.47 ⁵⁴	78.2 ⁹
28.3	30.18 ²²	91.4 ³	33.31 ¹⁶	22.7 ²	7.73 ²¹	60.8 ¹	32.93 ⁵⁶	78.6 ⁴
apt. 7.3	29.95 ²³	91.3 ¹	33.15 ¹⁶	22.5 ²	7.51 ²²	60.6 ²	32.37 ⁵⁶	78.4 ²
17.2	29.72 ²³	90.8 ⁵	32.98 ¹⁷	22.3 ²	7.28 ²³	60.1 ⁵	31.82 ⁵⁵	77.7 ⁷
27.2	29.51 ²¹	89.9 ⁹	32.83 ¹⁵	22.1 ²	7.08 ²⁰	59.4 ⁷	31.28 ⁵⁴	76.5 ¹²
ct. 7.2	29.32 ¹⁹	88.5 ¹⁴	32.71 ¹²	22.0 ¹	6.90 ¹⁸	58.5 ⁹	30.79 ⁴⁹	74.8 ¹⁷
17.1	29.17 ¹⁵	86.7 ¹⁸	32.61 ¹⁰	22.0 ⁰	6.77 ¹³	57.3 ¹²	30.35 ⁴⁴	72.6 ²²
27.1	29.05 ¹²	84.6 ²¹	32.55 ⁶	22.0 ⁰	6.68 ⁹	56.1 ¹²	29.97 ³⁸	70.0 ²⁶
ov. 6.1	28.99 ⁶	82.1 ²⁵	32.54 ¹	22.1 ¹	6.66 ²	54.7 ¹⁴	29.68 ²⁹	67.0 ³⁰
16.1	28.97 ²	79.4 ²⁷	32.57 ³	22.4 ³	6.70 ⁴	53.4 ¹³	29.48 ²⁰	63.7 ³³
26.0	29.01 ⁴	76.4 ³⁰	32.66 ⁹	22.8 ⁴	6.81 ¹¹	52.1 ¹³	29.38 ¹⁰	60.2 ³⁵
lec. 6.0	29.11 ¹⁰	73.3 ³¹	32.80 ¹⁴	23.3 ⁵	6.98 ¹⁷	50.9 ¹²	29.39 ¹	56.6 ³⁶
16.0	29.26 ¹⁵	70.2 ³¹	32.98 ¹⁸	23.9 ⁶	7.21 ²³	49.8 ¹¹	29.50 ¹¹	52.9 ³⁷
26.0	29.46 ²⁰	67.1 ³¹	33.20 ²²	24.6 ⁷	7.50 ²⁹	49.0 ⁸	29.72 ²²	49.3 ³⁶
35.9								
c δ, Tan δ	1.202	+0.667	1.038	-0.280	1.370	-0.937	2.441	+2.227
an Place	27°.992	86''.13	30°.075	13''.99	3°.734	42''.20	32°.305	69''.16
α, D ₀ α	-0.02	+0.01	+0.01	0.00	+0.02	-0.01	-0.06	+0.03
δ, D ₀ δ	-0.1	-1.0	-0.1	-1.0	-0.1	-1.0	-0.1	-1.0

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	α Herculis. Var. 3.1-3.9		δ Herculis. Mag. 3.2		π Herculis. Mag. 3.4		59 Apodis (G.). Mag. 5.9	
	Right Ascension.	Declination N.	Right Ascension.	Declination N.	Right Ascension.	Declination N.	Right Ascension.	Declination S.
	h m 17 10	s +14 28	h m 17 11	s +24 55	h m 17 12	s +36 53	h m 17 15	s -80 46
Jan. 0.9	45.48 ²²	59.7 ²³	31.47 ²¹	67.0 ²⁸	4.01 ²¹	61.9 ³¹	26.05 ¹⁰⁸	59.9 ²⁵
10.9	45.70 ²⁴	57.4 ²¹	31.68 ²⁵	64.2 ²⁸	4.22 ²¹	58.8 ³¹	27.13 ¹²⁷	57.4 ²²
20.9	45.94 ²⁷	55.3 ²⁰	31.93 ²⁸	61.7 ²³	4.48 ²⁶	56.0 ²⁸	28.40 ¹⁴³	55.2 ¹⁸
30.9	46.21 ²⁹	53.3 ¹⁷	32.21 ³¹	59.4 ¹⁵	4.77 ³³	53.5 ¹⁶	29.83 ¹⁶⁶	53.4 ⁸
Feb. 9.8	46.50 ³⁰	51.6 ¹³	32.50 ³¹	57.5 ¹⁵	5.08 ³³	51.3 ²²	31.39 ¹⁶⁶	52.1 ⁸
19.8	46.80 ³¹	50.3 ⁹	32.81 ³²	56.0 ¹⁰	5.41 ³⁴	49.7 ¹⁰	33.05 ¹⁷⁰	51.3 ⁴
Mar. 1.8	47.11 ³¹	49.4 ⁵	33.13 ³¹	55.0 ⁵	5.75 ³⁵	48.7 ⁵	34.75 ¹⁷²	50.9 ¹
11.7	47.42 ³⁰	48.9 ⁰	33.44 ³¹	54.5 ¹	6.10 ³⁵	48.2 ²	36.47 ¹⁷⁰	51.0 ⁵
21.7	47.72 ²⁹	48.9 ⁴	33.75 ³⁰	54.6 ⁵	6.44 ³⁴	48.4 ⁷	38.17 ¹⁶⁵	51.5 ⁹
31.7	48.01 ²⁷	49.3 ⁸	34.05 ²⁹	55.1 ¹¹	6.76 ³¹	49.1 ¹³	39.82 ¹⁵⁷	52.4 ¹⁴
Apr. 10.7	48.28 ²⁶	50.1 ¹¹	34.34 ²⁶	56.2 ¹⁴	7.07 ²⁸	50.4 ¹⁷	41.39 ¹⁴⁶	53.8 ¹⁷
20.6	48.54 ²⁴	51.2 ¹⁵	34.60 ²⁴	57.6 ¹⁹	7.35 ²⁵	52.1 ²²	42.85 ¹³³	55.5 ²¹
30.6	48.78 ²¹	52.7 ¹⁷	34.84 ²¹	59.5 ²¹	7.60 ²²	54.3 ²⁵	44.18 ¹¹⁷	57.6 ²³
May 10.6	48.99 ¹⁸	54.4 ¹⁹	35.05 ¹⁸	61.6 ²³	7.82 ¹⁹	56.8 ²⁷	45.35 ⁹⁹	59.9 ²⁶
20.6	49.17 ¹⁶	56.3 ²⁰	35.23 ¹⁵	63.9 ²⁴	8.01 ¹⁴	59.5 ²⁸	46.34 ⁷⁹	62.5 ²⁷
30.5	49.33 ¹²	58.3 ²⁰	35.38 ¹²	66.3 ²⁶	8.15 ¹⁰	62.3 ³⁰	47.13 ⁵⁷	65.2 ²⁹
June 9.5	49.45 ⁸	60.3 ²⁰	35.50 ⁷	68.8 ²⁵	8.25 ⁶	65.3 ²⁹	47.70 ³⁴	68.1 ²⁹
19.5	49.53 ⁵	62.3 ¹⁹	35.57 ³	71.3 ²³	8.31 ¹	68.2 ²⁷	48.04 ¹²	71.0 ²⁹
29.4	49.58 ⁰	64.2 ¹⁶	35.60 ⁰	73.6 ²⁰	8.32 ⁸	70.9 ²³	48.16 ³⁵	73.9 ²⁶
July 9.4	49.58 ³	66.1 ¹⁶	35.60 ⁵	75.8 ²⁰	8.29 ³	73.5 ²³	48.03 ³⁵	76.7 ²⁶
19.4	49.55 ⁶	67.7 ¹⁴	35.55 ⁹	77.8 ¹⁸	8.21 ¹²	75.8 ²¹	47.68 ⁵⁷	79.3 ²³
29.4	49.49 ¹⁰	69.1 ¹²	35.46 ¹²	79.6 ¹⁵	8.09 ¹⁶	77.9 ¹⁷	47.11 ⁷⁶	81.6 ¹⁹
Aug. 8.3	49.39 ¹³	70.3 ¹⁰	35.34 ¹⁰	81.1 ¹¹	7.93 ¹⁹	79.6 ¹³	46.35 ⁹⁴	83.5 ¹⁵
18.3	49.26 ¹⁶	71.3 ⁷	35.19 ¹⁷	82.2 ⁸	7.74 ²¹	80.9 ⁹	45.41 ¹⁰⁶	85.0 ¹¹
28.3	49.10 ¹⁷	72.0 ⁴	35.02 ¹⁹	83.0 ⁵	7.53 ²⁴	81.8 ⁵	44.35 ¹¹⁶	86.1 ⁶
Sept. 7.3	48.93 ¹⁷	72.4 ¹	34.83 ²⁰	83.5 ⁰	7.29 ²⁴	82.3 ⁰	43.19 ¹²⁰	86.7 ¹
17.2	48.76 ¹⁸	72.5 ²	34.63 ²⁰	83.5 ³	7.05 ²⁴	82.3 ⁴	41.99 ¹¹⁹	86.6 ⁵
27.2	48.58 ¹⁷	72.3 ⁴	34.43 ²⁰	83.2 ⁶	6.81 ²³	81.9 ⁹	40.80 ¹¹²	86.1 ¹²
Oct. 7.2	48.41 ¹⁵	71.9 ⁸	34.23 ¹⁷	82.6 ¹¹	6.58 ²¹	81.0 ¹³	39.68 ¹⁰²	84.9 ¹⁶
17.1	48.26 ¹²	71.1 ¹¹	34.06 ¹⁴	81.5 ¹⁴	6.37 ¹⁸	79.7 ¹⁷	38.66 ⁸⁶	83.3 ²¹
27.1	48.14 ⁸	70.0 ¹⁴	33.92 ¹⁰	80.1 ¹⁸	6.19 ¹⁴	78.0 ²¹	37.80 ⁶⁵	81.2 ²⁵
Nov. 6.1	48.06 ⁴	68.6 ¹⁶	33.82 ⁶	78.3 ²¹	6.05 ⁹	75.9 ²⁵	37.15 ⁴¹	78.7 ²⁶
16.1	48.02 ⁰	67.0 ¹⁹	33.76 ¹	76.2 ²³	5.96 ⁴	73.4 ²⁷	36.74 ¹⁵	75.9 ²⁰
26.0	48.02 ¹⁰	65.1 ²¹	33.75 ⁹	73.9 ²⁵	5.92 ⁸	70.7 ³⁰	36.59 ⁴¹	73.0 ³¹
Dec. 6.0	48.08 ¹⁰	63.0 ²²	33.79 ⁹	71.4 ²⁷	5.94 ²	67.7 ³²	36.71 ⁴¹	69.9 ³¹
16.0	48.18 ¹⁵	60.8 ²³	33.88 ¹⁴	68.7 ²⁸	6.02 ¹³	64.5 ³²	37.12 ⁶⁷	66.8 ²⁹
26.0	48.33 ¹⁹	58.5 ²³	34.02 ¹⁹	65.9 ²⁸	6.15 ¹⁸	61.3 ³¹	37.79 ⁹²	63.9 ²⁷
35.9	48.52 ¹⁹	56.2 ²³	34.21 ¹⁹	63.1 ²⁸	6.33 ¹⁸	58.2 ³¹	38.71 ⁹²	61.2 ²⁷
Sec δ , Tan δ	1.033	+0.258	1.103	+0.465	1.251	+0.751	6.245	-6.164
Mean Place	46°.261	70°.94	32°.370	79°.33	5°.139	75°.46	32°.567	58°.79
D ψ α , D ω α	-0.01	0.00	-0.01	+0.01	-0.02	+0.01	+0.16	-0.08
D ψ δ , D ω δ	-0.1	-1.0	-0.1	-1.0	-0.1	-1.0	-0.1	-1.0

FOR THE UPPER TRANSIT AT WASHINGTON.

n Solar late.	θ Ophiuchi. Mag. 3.4		η Herculis. Mag. 5.4		β Aræ. Mag. 2.8		δ Ophiuchi. Mag. 4.3	
	Right Ascension.	Declina- tion S.	Right Ascension.	Declina- tion N.	Right Ascension.	Declina- tion S.	Right Ascension.	Declina- tion S.
	h m 17 16	° ' " -24 54	h m 17 17	° ' " +32 34	h m 17 18	° ' " -55 27	h m 17 21	° ' " -24 5
	s 46.48	" 62.8	s 27.63	" 21.9	s 12.38	" 5.5	s 9.85	" 60.1
l. 0.9	46.73 ²⁵	63.0 ²	27.83 ²⁰	18.9 ³⁰	12.75 ³⁷	4.0 ¹⁵	10.10 ²⁵	60.3 ²
10.9	47.01 ²⁸	63.3 ³	28.08 ²⁵	16.1 ²⁸	13.17 ⁴²	2.8 ¹²	10.38 ²⁸	60.6 ³
20.9	47.32 ³¹	63.7 ⁴	28.36 ²⁸	13.6 ²⁵	13.64 ⁴⁷	1.8 ¹⁰	10.68 ³⁰	61.0 ⁴
30.9	47.65 ³³	64.1 ⁴	28.66 ³⁰	11.5 ²¹	14.13 ⁴⁹	1.2 ⁶	11.00 ³²	61.4 ⁴
h. 9.8	47.65 ³⁴	64.1 ⁴	28.66 ³²	11.5 ¹⁶	14.13 ⁵²	1.2 ⁴	11.00 ³⁴	61.4 ⁵
19.8	47.99	64.5	28.98	9.9	14.65	0.8	11.34	61.9
r. 1.8	48.34 ³⁵	64.9 ⁴	29.31 ³³	8.8 ¹¹	15.17 ⁵²	0.7 ¹	11.68 ³⁴	62.3 ⁴
11.8	48.68 ³⁴	65.3 ⁴	29.64 ³³	8.3 ⁵	15.70 ⁵³	0.9 ²	12.02 ³⁴	62.6 ³
21.7	49.02 ³⁴	65.7 ⁴	29.97 ³³	8.3 ⁰	16.22 ⁵²	1.4 ⁵	12.35 ³³	62.9 ³
31.7	49.34 ³²	65.9 ²	30.28 ³¹	8.9 ⁶	16.72 ⁵⁰	2.1 ⁷	12.68 ³³	63.2 ³
	49.34 ³²	65.9 ³	30.28 ³⁹	8.9 ¹²	16.72 ⁴⁹	2.1 ⁹	12.68 ³²	63.2 ¹
r. 10.7	49.66	66.2	30.58	10.1	17.21	3.0	13.00	63.3
20.6	49.96 ³⁰	66.4 ²	30.86 ²⁸	11.7 ¹⁶	17.67 ⁴⁶	4.1 ¹¹	13.30 ³⁰	63.4 ¹
30.6	50.24 ²⁸	66.5 ¹	31.11 ²⁵	13.7 ²⁰	18.10 ⁴³	5.5 ¹⁴	13.58 ²⁸	63.5 ¹
y 10.6	50.49 ²⁵	66.6 ¹	31.33 ²²	16.0 ²³	18.48 ³⁸	7.0 ¹⁵	13.84 ²⁶	63.6 ¹
20.6	50.72 ²³	66.7 ¹	31.52 ¹⁹	18.6 ²⁶	18.82 ³⁴	8.6 ¹⁶	14.07 ²³	63.6 ⁰
	50.72 ²⁰	66.7 ²	31.52 ¹⁵	18.6 ²⁷	18.82 ²⁹	8.6 ¹⁷	14.07 ²⁰	63.6 ¹
30.5	50.92	66.9	31.67	21.3	19.11	10.3	14.27	63.7
le 9.5	51.08 ¹⁶	67.0 ¹	31.78 ¹¹	24.0 ²⁷	19.34 ²³	12.1 ¹⁸	14.43 ¹⁶	63.8 ¹
19.5	51.21 ¹³	67.1 ¹	31.85 ⁷	26.8 ²⁸	19.51 ¹⁷	14.0 ¹⁹	14.56 ¹³	63.8 ⁰
29.5	51.29 ⁸	67.3 ²	31.88 ³	29.4 ²⁶	19.62 ¹¹	15.8 ¹⁸	14.65 ⁹	63.9 ¹
y 9.4	51.33 ⁴	67.4 ¹	31.86 ²	31.9 ²⁵	19.65 ³	17.6 ¹⁸	14.70 ⁵	64.0 ¹
	51.33 ⁰	67.4 ²	31.86 ⁶	31.9 ²²	19.65 ³	17.6 ¹⁶	14.70 ⁰	64.0 ²
19.4	51.33	67.6	31.80	34.1	19.62	19.2	14.70	64.2
29.4	51.29 ⁴	67.8 ²	31.70 ¹⁰	36.1 ²⁰	19.52 ¹⁰	20.7 ¹⁵	14.66 ⁴	64.3 ¹
g. 8.3	51.21 ⁸	67.8 ¹	31.70 ¹⁶	36.1 ¹⁶	19.52 ¹⁰	20.7 ¹⁵	14.66 ⁸	64.3 ¹
18.3	51.21 ¹²	67.9 ⁰	31.57 ¹³	37.7 ¹³	19.37 ¹⁵	21.9 ¹²	14.58 ¹¹	64.4 ⁰
28.3	51.09 ¹⁴	67.9 ⁰	31.40 ²⁰	39.0 ⁹	19.16 ²¹	22.9 ¹⁰	14.47 ¹¹	64.4 ⁰
	50.95 ¹⁶	67.9 ¹	31.20 ²¹	39.9 ⁵	19.16 ²⁶	22.9 ⁶	14.47 ¹⁴	64.4 ⁰
dt. 7.3	50.79 ¹⁸	67.8 ¹	30.99 ²³	40.4 ¹	18.90 ²⁸	23.5 ³	14.33 ¹⁶	64.4 ¹
17.2	50.61 ¹⁷	67.7 ³	30.76 ²²	40.5 ⁴	18.62 ³⁰	23.8 ⁰	14.17 ¹⁸	64.3 ¹
27.2	50.44 ¹⁷	67.4 ³	30.54 ²²	40.1 ⁷	18.32 ³⁰	23.8 ⁵	13.99 ¹⁷	64.2 ²
7.2	50.27 ¹⁴	67.1 ³	30.32 ²⁰	39.4 ¹²	18.02 ²⁸	23.3 ⁸	13.82 ¹⁷	64.0 ³
17.2	50.13 ¹¹	66.7 ⁴	30.12 ¹⁶	38.2 ¹⁶	17.74 ²⁵	22.5 ¹²	13.65 ¹⁴	63.7 ³
	50.13 ¹¹	66.7 ⁴	30.12 ¹⁶	38.2 ¹⁶	17.49 ²⁰	21.3 ¹⁴	13.51 ¹¹	63.4 ⁴
27.1	50.02	66.3	29.96	36.6	17.29	19.9	13.40	63.0
r. 6.1	49.95 ⁷	65.9 ⁴	29.83 ¹³	34.6 ²⁰	17.15 ¹⁴	18.2 ¹⁷	13.33 ⁷	62.7 ³
16.1	49.93 ²	65.5 ⁴	29.75 ⁸	32.3 ²³	17.09 ⁶	16.3 ¹⁹	13.30 ³	62.4 ³
26.0	49.95 ²	65.2 ³	29.72 ³	29.7 ²⁶	17.10 ¹	14.3 ²⁰	13.32 ²	62.1 ³
6.0	50.04 ¹³	65.0 ²	29.74 ⁷	26.8 ³⁰	17.10 ¹⁰	12.3 ¹⁹	13.32 ⁸	61.9 ²
	50.04 ¹³	65.0 ¹	29.74 ⁷	26.8 ³⁰	17.20 ¹⁸	12.3 ¹⁹	13.40 ¹³	61.9 ¹
16.0	50.17 ¹⁸	64.9 ⁰	29.81 ¹³	23.8 ³¹	17.38 ²⁵	10.4 ¹⁸	13.53 ¹⁷	61.8 ¹
26.0	50.35 ²³	64.9 ⁰	29.94 ¹⁸	20.7 ³⁰	17.63 ³³	8.6 ¹⁷	13.70 ²²	61.9 ¹
35.9	50.58 ²³	65.0 ¹	30.12 ¹⁸	17.7 ³⁰	17.96 ³³	6.9 ¹⁷	13.92 ²²	62.0 ¹
Tan δ	1.103	-0.465	1.187	+0.639	1.763	-1.452	1.096	-0.447
Place	47°.257	56''.56	28°.680	34''.77	13°.862	2''.48	10°.626	53''.66
D_{α}	+0.01	-0.01	-0.02	+0.01	+0.04	-0.02	+0.01	-0.01
$D_{\alpha} \delta$	-0.1	-1.0	-0.1	-1.0	-0.1	-1.0	-0.1	-1.0

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	σ Ophiuchi. Mag. 4.4		δ Aræ. Mag. 3.8		α Aræ. Mag. 3.0		λ Herculis. Mag. 4.5	
	Right Ascension.	Declination N.	Right Ascension.	Declination S.	Right Ascension.	Declination S.	Right Ascension.	Declination N.
	h m	° '	h m	° '	h m	° '	h m	° '
	17 22	+ 4 12	17 23	- 60 36	17 25	- 49 48	17 27	+ 26 10
	s	"	s	"	s	"	s	"
Jan. 0.9	17.06 ²¹	38.7 ¹⁸	23.44 ⁴¹	55.3 ¹⁷	14.86 ³²	39.9 ¹²	17.21 ¹⁹	14.7 ²⁸
10.9	17.27 ²⁴	36.9 ¹⁷	23.85 ⁴⁶	53.6 ¹⁵	15.18 ³⁷	38.7 ¹¹	17.40 ²³	11.9 ²⁰
20.9	17.51 ²⁷	35.2 ¹⁶	24.31 ⁵²	52.1 ¹²	15.55 ⁴¹	37.6 ⁸	17.63 ²⁷	9.3 ²⁵
30.9	17.78 ²⁸	33.6 ¹⁴	24.83 ⁵⁸	50.9 ⁹	15.96 ⁴⁶	36.8 ³	17.90 ³⁰	7.0 ¹⁶
Feb. 9.8	18.06 ³⁰	32.2 ¹¹	25.39 ⁵⁸	50.0 ⁶	16.40 ⁴⁶	36.3 ³	18.19 ³⁰	5.0 ¹⁶
19.8	18.36 ³⁰	31.1 ⁸	25.97 ⁵⁹	49.4 ³	16.86 ⁴⁶	36.0 ¹	18.49 ³¹	3.4 ¹¹
Mar. 1.8	18.66 ³¹	30.3 ⁵	26.56 ⁶⁰	49.1 ¹	17.32 ⁴⁶	35.9 ³	18.80 ³²	2.3 ⁵
11.8	18.97 ³⁰	29.8 ²	27.16 ⁶⁰	49.2 ⁴	17.79 ⁴⁶	36.0 ⁶	19.12 ³⁰	1.8 ⁵
21.7	19.27 ²⁹	29.7 ¹	27.76 ⁵⁸	49.6 ⁷	18.25 ⁴⁶	36.3 ⁷	19.44 ³⁰	1.8 ⁵
31.7	19.56 ²⁸	29.9 ⁵	28.34 ⁵⁶	50.3 ¹⁰	18.71 ⁴³	36.9 ⁷	19.74 ²⁹	2.3 ¹⁰
Apr. 10.7	19.84 ²⁶	30.4 ⁸	28.90 ⁵³	51.3 ¹²	19.14 ⁴²	37.6 ⁹	20.03 ²⁸	3.3 ¹⁴
20.6	20.10 ²⁵	31.2 ¹¹	29.43 ⁴⁹	52.5 ¹⁴	19.56 ³⁹	38.5 ¹¹	20.31 ²⁵	4.7 ¹⁹
30.6	20.35 ²²	32.3 ¹³	29.92 ⁴⁴	53.9 ¹⁷	19.95 ³⁵	39.6 ¹²	20.56 ²³	6.6 ²¹
May 10.6	20.57 ¹⁷	33.6 ¹⁵	30.36 ³⁹	55.6 ¹⁸	20.30 ³²	40.8 ¹⁴	20.79 ²⁰	8.7 ²⁴
20.6	20.77 ¹⁴	35.1 ¹⁵	30.75 ³³	57.4 ¹⁹	20.62 ²⁷	42.1 ¹⁴	20.99 ¹⁶	11.1 ²⁵
30.5	20.94 ¹⁴	36.6 ¹⁵	31.08 ²⁷	59.3 ²¹	20.89 ²²	43.5 ¹⁵	21.15 ¹³	13.6 ²⁶
June 9.5	21.08 ¹¹	38.1 ¹⁶	31.35 ¹⁹	61.4 ²¹	21.11 ¹⁷	45.0 ¹⁵	21.28 ⁸	16.2 ²⁵
19.5	21.19 ⁷	39.7 ¹⁵	31.54 ¹¹	63.5 ²¹	21.28 ¹¹	46.5 ¹⁶	21.36 ⁵	18.7 ²⁵
29.5	21.26 ²	41.2 ¹³	31.65 ⁴	65.6 ²⁰	21.39 ¹	48.1 ¹⁴	21.41 ³	21.2 ²⁴
July 9.4	21.28 ⁰	42.5 ¹³	31.69 ⁴	67.6 ¹⁸	21.44 ¹	49.6 ¹⁴	21.41 ³	23.6 ²¹
19.4	21.28 ⁵	43.8 ¹¹	31.65 ¹²	69.4 ¹⁷	21.43 ⁷	51.0 ¹³	21.38 ⁸	25.7 ¹⁹
29.4	21.23 ¹¹	44.9 ¹⁰	31.53 ¹⁸	71.1 ¹⁵	21.36 ¹²	52.3 ¹¹	21.30 ¹¹	27.6 ¹⁶
Aug. 8.3	21.15 ¹¹	45.9 ⁷	31.35 ²⁵	72.6 ¹¹	21.24 ¹⁸	53.4 ⁸	21.19 ¹⁵	29.2 ¹⁵
18.3	21.04 ¹⁴	46.6 ⁶	31.10 ³⁰	73.7 ⁸	21.06 ²¹	54.2 ⁶	21.04 ¹⁷	30.5 ¹⁰
28.3	20.90 ¹⁶	47.2 ⁴	30.80 ³³	74.5 ⁴	20.85 ²⁴	54.8 ³	20.87 ¹⁹	31.5 ⁶
Sept. 7.3	20.74 ¹⁷	47.6 ²	30.47 ³⁵	74.9 ⁰	20.61 ²⁶	55.1 ⁰	20.68 ²¹	32.1 ²
17.2	20.57 ¹⁷	47.8 ⁰	30.12 ³⁶	74.9 ⁴	20.35 ²⁶	55.1 ⁴	20.47 ²⁰	32.3 ²
27.2	20.40 ¹⁶	47.8 ³	29.76 ³⁴	74.5 ⁸	20.09 ²⁴	54.7 ⁷	20.27 ²⁰	32.1 ⁶
Oct. 7.2	20.24 ¹⁴	47.5 ⁴	29.42 ³⁰	73.7 ¹²	19.85 ²²	54.0 ⁹	20.07 ¹⁸	31.5 ⁹
17.2	20.10 ¹¹	47.1 ⁷	29.12 ²⁴	72.5 ¹⁶	19.63 ¹⁸	53.1 ¹³	19.89 ¹⁶	30.6 ¹⁵
27.1	19.99 ⁸	46.4 ⁹	28.88 ¹⁸	70.9 ¹⁸	19.45 ¹²	51.8 ¹⁴	19.73 ¹²	29.3 ¹⁷
Nov. 6.1	19.91 ⁴	45.5 ¹¹	28.70 ⁹	69.1 ²¹	19.33 ⁶	50.4 ¹⁶	19.61 ⁷	27.6 ²⁰
16.1	19.87 ⁵	44.4 ¹³	28.61 ¹	67.0 ²²	19.27 ¹	48.8 ¹⁷	19.54 ³	25.6 ²⁵
26.0	19.88 ¹⁰	43.1 ¹⁵	28.60 ¹⁸	64.8 ²³	19.28 ¹⁶	47.1 ¹⁶	19.51 ²	23.3 ²⁵
Dec. 6.0	19.93 ¹⁰	41.6 ¹⁷	28.69 ¹⁸	62.5 ²²	19.36 ¹⁶	45.4 ¹⁶	19.53 ⁸	20.8 ²⁷
16.0	20.03 ¹⁵	39.9 ¹⁷	28.87 ²⁷	60.3 ²¹	19.52 ²²	43.8 ¹⁶	19.61 ¹²	18.1 ²⁸
26.0	20.18 ¹⁹	38.2 ¹⁸	29.14 ³⁶	58.2 ¹⁹	19.74 ²⁹	42.2 ¹⁴	19.73 ¹⁷	15.3 ²⁸
35.9	20.37 ¹⁵	36.4 ¹⁸	29.50 ³⁶	56.3 ¹⁹	20.03 ²⁹	40.8 ¹⁴	19.90 ¹⁷	12.5 ²⁸
Sec δ , Tan δ	1.003	+0.074	2.038	-1.776	1.550	-1.184	1.114	+0.401
Mean Place	17°.802	48''.44	25°.226	52''.45	16°.107	36''.01	18°.174	26''.42
D ψ a, D ω a	0.00	0.00	+0.05	-0.02	+0.03	-0.01	-0.01	0.00
D ψ δ , D ω δ	-0.1	-1.0	-0.1	-1.0	-0.1	-1.0	-0.1	-1.0

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	λ Scorpii. Mag. 1.7		β Draconis. Mag. 3.0		α Ophiuchi. Mag. 2.1		ϵ Serpentis. Mag. 3.6	
	Right Ascension.	Declination S.	Right Ascension.	Declination N.	Right Ascension.	Declination N.	Right Ascension.	Declination S.
	h m 17 27	° ' " — 37 2	h m 17 28	° ' " + 52 21	h m 17 30	° ' " + 12 36	h m 17 32	° ' " — 15 20
in. 1.0	49.15 ^s	39.2	28.89 ^s	36.5	58.47 ^s	65.2	42.33 ^s	52.7
10.9	49.42 ²⁷	38.6 ⁶	29.09 ²⁰	33.1 ³⁴	58.67 ²⁰	63.0 ²²	42.55 ²²	53.4 ⁷
20.9	49.73 ³¹	38.2 ⁴	29.35 ²⁶	29.9 ³²	58.90 ²³	61.0 ²⁰	42.81 ²⁶	54.1 ⁷
30.9	50.07 ³⁴	38.0 ²	29.67 ³²	27.1 ²⁸	59.16 ²⁶	59.1 ¹⁹	43.09 ²⁸	54.8 ⁷
b. 9.8	50.43 ³⁶	37.8 ²	30.03 ³⁶	24.7 ²⁴	59.44 ²⁸	57.4 ¹⁷	43.39 ³⁰	55.5 ⁷
19.8	50.81 ³⁸	37.8 ⁰	30.41 ³⁸	22.8 ¹⁹	59.73 ²⁹	56.1 ¹³	43.70 ³¹	56.1 ⁶
ar. 1.8	51.20 ³⁹	37.9 ¹	30.82 ⁴¹	21.6 ¹²	60.03 ³⁰	55.2 ⁹	44.02 ³²	56.5 ⁴
11.8	51.58 ³⁸	38.1 ²	31.24 ⁴²	21.1 ⁵	60.34 ³¹	54.7 ⁵	44.34 ³²	56.9 ⁴
21.7	51.96 ³⁸	38.4 ³	31.65 ⁴¹	21.1 ⁰	60.64 ³⁰	54.6 ¹	44.66 ³²	57.1 ²
31.7	52.34 ³⁸	38.8 ⁴	32.05 ⁴⁰	21.9 ⁸	60.93 ²⁹	54.9 ³	44.97 ³¹	57.1 ⁰
or. 10.7	52.70 ³⁶	39.2 ⁴	32.44 ³⁹	23.2 ¹³	61.22 ²⁹	55.6 ⁷	45.27 ³⁰	57.0 ¹
20.7	53.04 ³⁴	39.7 ⁵	32.79 ³⁵	25.1 ¹⁹	61.49 ²⁷	56.7 ¹¹	45.56 ²⁹	56.7 ³
30.6	53.37 ³³	40.2 ⁵	33.10 ³¹	27.5 ²⁴	61.74 ²⁵	58.1 ¹⁴	45.83 ²⁷	56.4 ³
ly 10.6	53.67 ³⁰	40.8 ⁶	33.37 ²⁷	30.2 ²⁷	61.97 ²³	59.7 ¹⁶	46.08 ²⁵	55.9 ⁵
20.6	53.93 ²⁶	41.5 ⁷	33.59 ²²	33.3 ³¹	62.17 ²⁰	61.5 ¹⁸	46.31 ²³	55.4 ⁵
30.5	54.17 ²⁴	42.2 ⁷	33.75 ¹⁶	36.5 ³²	62.34 ¹⁷	63.5 ²⁰	46.51 ²⁰	54.9 ⁵
ne 9.5	54.36 ¹⁹	43.0 ⁸	33.86 ¹¹	39.8 ³³	62.48 ¹⁴	65.5 ²⁰	46.67 ¹⁶	54.5 ⁴
19.5	54.51 ¹⁵	43.9 ⁹	33.91 ⁵	43.1 ³³	62.58 ¹⁰	67.5 ²⁰	46.81 ¹⁴	54.0 ⁵
29.5	54.61 ¹⁰	44.7 ⁸	33.89 ²	46.2 ³¹	62.65 ⁷	69.4 ¹⁹	46.90 ⁹	53.6 ⁴
ly 9.4	54.67 ⁶	45.5 ⁸	33.82 ⁷	49.2 ³⁰	62.68 ³	71.2 ¹⁸	46.95 ⁵	53.2 ⁴
19.4	54.68 ¹	46.3 ⁸	33.69 ¹³	52.0 ²⁸	62.67 ¹	72.8 ¹⁶	46.96 ¹	52.8 ⁴
29.4	54.63 ⁵	47.0 ⁷	33.51 ¹⁸	54.4 ²⁴	62.62 ⁵	74.3 ¹⁵	46.93 ³	52.5 ³
g. 8.4	54.55 ⁸	47.6 ⁶	33.28 ²³	56.5 ²¹	62.53 ⁹	75.6 ¹³	46.86 ⁷	52.3 ²
18.3	54.42 ¹³	48.1 ⁵	33.00 ²⁸	58.1 ¹⁶	62.41 ¹²	76.6 ¹⁰	46.76 ¹⁰	52.1 ²
28.3	54.26 ¹⁶	48.4 ³	32.69 ³¹	59.3 ¹²	62.27 ¹⁴	77.4 ⁸	46.63 ¹³	51.9 ²
or. 7.3	54.07 ¹⁹	48.6 ²	32.36 ³³	59.9 ⁶	62.11 ¹⁶	77.9 ⁵	46.48 ¹⁵	51.8 ¹
17.2	53.87 ²⁰	48.5 ¹	32.01 ³⁵	60.1 ²	61.93 ¹⁸	78.1 ²	46.32 ¹⁶	51.6 ²
27.2	53.67 ²⁰	48.2 ³	31.66 ³⁵	59.8 ³	61.75 ¹⁸	78.0 ¹	46.15 ¹⁷	51.5 ¹
b. 7.2	53.47 ²⁰	47.8 ⁴	31.32 ³⁴	59.0 ⁸	61.58 ¹⁷	77.7 ³	45.99 ¹⁶	51.4 ¹
17.2	53.30 ¹⁷	47.1 ⁷	31.00 ³²	57.7 ¹³	61.43 ¹⁵	77.0 ⁷	45.85 ¹⁴	51.4 ⁰
27.1	53.16 ¹⁴	46.3 ⁸	30.72 ²⁸	55.9 ¹⁸	61.30 ¹³	76.1 ⁹	45.73 ¹²	51.3 ¹
v. 6.1	53.07 ⁹	45.4 ⁹	30.48 ²⁴	53.6 ²³	61.20 ¹⁰	74.9 ¹²	45.65 ⁸	51.4 ¹
16.1	53.03 ⁴	44.4 ¹⁰	30.30 ¹⁸	50.9 ²⁷	61.15 ⁵	73.4 ¹⁵	45.61 ⁴	51.5 ¹
26.1	53.04 ¹	43.4 ¹⁰	30.18 ¹²	47.9 ³⁰	61.14 ¹	71.7 ¹⁷	45.62 ¹	51.7 ²
z. 6.0	53.12 ⁸	42.5 ⁹	30.13 ⁵	44.6 ³³	61.18 ⁴	69.8 ¹⁹	45.68 ⁶	52.1 ⁴
16.0	53.26 ¹⁴	41.6 ⁹	30.15 ²	41.2 ³⁴	61.26 ⁸	67.7 ²¹	45.79 ¹¹	52.5 ⁴
26.0	53.45 ¹⁹	40.8 ⁸	30.24 ⁹	37.7 ³⁵	61.39 ¹³	65.6 ²¹	45.95 ¹⁶	53.1 ⁶
35.9	53.69 ²⁴	40.1 ⁷	30.41 ¹⁷	34.2 ³⁵	61.57 ¹⁸	63.4 ²²	46.15 ²⁰	53.7 ⁶
Tan δ	1.253	—0.755	1.638	+1.297	1.025	+0.224	1.037	—0.274
Place	50°.090	33'".95	30°.684	49'".93	59°.290	75'".66	43°.076	45'".12
D _a	+0.02	—0.01	—0.03	+0.01	—0.01	0.00	+0.01	0.00
D _s	—0.1	—1.0	—0.1	—1.0	—0.1	—1.0	0.0	—1.0

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	ϵ Herculis. Mag. 3.8		η Pavonis. Mag. 3.6		ω Draconis. Mag. 4.9		β Ophiuchi. Mag. 2.9	
	Right Ascension.	Declination N.	Right Ascension.	Declination S.	Right Ascension.	Declination N.	Right Ascension.	Declination N.
	h m 17 37 s	° ' " +46 2 "	h m 17 37 s	° ' " -64 41 "	h m 17 37 s	° ' " +68 47 "	h m 17 39 s	° ' " + 435 "
Jan. 1.0	2.41	51.3	21.05	8.5	23.27	37.2	15.61	57.6
10.9	2.59 ¹⁸	48.0 ³³	21.47 ⁴²	6.4 ²¹	23.49 ²²	33.7 ³⁵	15.81 ²⁰	55.9 ¹⁷
20.9	2.83 ²⁴	44.9 ³¹	21.97 ⁵⁰	4.6 ¹⁸	23.82 ³³	30.4 ³³	16.04 ²³	54.2 ¹⁷
30.9	3.12 ²⁹	42.1 ²⁸	22.53 ⁵⁶	3.0 ¹⁶	24.25 ⁴³	27.5 ²⁹	16.29 ²⁵	52.6 ¹⁶
Feb. 9.8	3.44 ³²	39.7 ²⁴	23.14 ⁶¹	1.8 ¹²	24.76 ⁵¹	25.0 ²⁵	16.56 ²⁷	51.2 ¹⁴
19.8	3.79	37.8	23.79	1.0	25.33	23.1	16.85	50.1
Mar. 1.8	4.15 ³⁶	36.6 ¹²	24.46 ⁶⁷	0.5 ⁵	25.94 ⁶¹	21.8 ¹³	17.15 ³⁰	49.3
11.8	4.53 ³⁸	35.9 ⁷	25.14 ⁶⁸	0.3 ²	26.58 ⁶⁴	21.2 ⁶	17.45 ³⁰	48.9
21.7	4.91 ³⁸	35.9 ⁰	25.81 ⁶⁷	0.4 ¹	27.23 ⁶⁵	21.2 ⁰	17.75 ³⁰	48.8
31.7	5.27 ³⁶	36.5 ⁶	26.48 ⁶⁷	0.9 ⁵	27.86 ⁶³	21.9 ⁷	18.05 ³⁰	49.0
Apr. 10.7	5.62	37.7	27.12	1.8	28.45	23.3	18.33	49.6
20.7	5.95 ³³	39.5 ¹⁸	27.74 ⁶²	2.9 ¹¹	28.99 ⁵⁴	25.2 ¹⁹	18.61 ²⁸	50.4
30.6	6.25 ³⁰	41.7 ²²	28.31 ⁵⁷	4.2 ¹³	29.46 ⁴⁷	27.6 ²⁴	18.86 ²⁵	51.6
May 10.6	6.51 ²⁶	44.3 ²⁶	28.83 ⁵²	5.9 ¹⁷	29.86 ⁴⁰	30.4 ²⁸	19.10 ²⁴	52.9
20.6	6.73 ²²	47.2 ²⁹	29.29 ⁴⁶	7.7 ¹⁸	30.16 ³⁰	33.6 ³²	19.31 ²¹	54.4
30.5	6.90	50.3	29.69	9.7	30.37	36.9	19.50	56.0
June 9.5	7.02 ¹²	53.5 ³²	30.01 ³²	11.9 ²²	30.48 ¹¹	40.3 ³⁴	19.65 ¹⁵	57.6
19.5	7.10	56.7 ³¹	30.25 ²⁴	14.1 ²²	30.49 ¹⁰	43.7 ³⁴	19.77 ¹²	59.2
29.5	7.12 ²	59.8 ³²	30.40 ¹⁵	16.4 ²³	30.39 ²⁰	47.0 ³³	19.85 ⁵	60.8
July 9.4	7.08 ⁴	62.8 ³⁰	30.46 ⁶	18.6 ²²	30.19 ²⁹	50.2 ³²	19.90 ⁵	62.3
19.4	6.99	65.5	30.42	20.7	29.90	53.1	19.90	63.6
29.4	6.86 ¹³	67.9 ²⁴	30.30 ¹²	22.6 ¹⁹	29.52 ³⁸	55.7 ²⁶	19.87 ³	64.8
Aug. 8.4	6.68 ¹⁸	70.0 ²¹	30.10 ²⁰	24.3 ¹⁷	29.06 ⁴⁶	57.9 ²²	19.79 ⁸	65.9
18.3	6.45 ²³	71.7 ¹⁷	29.82 ²⁸	25.7 ¹⁴	28.53 ⁵³	59.7 ¹⁸	19.69 ¹⁰	66.7
28.3	6.20 ²⁵	72.9 ¹²	29.48 ³⁴	26.7 ¹⁰	27.95 ⁵⁸	61.0 ¹³	19.56 ¹³	67.3
Sept. 7.3	5.92	73.7	29.10	27.3	27.33	61.8	19.40	67.8
17.2	5.62 ³⁰	74.0 ³	28.69 ⁴¹	27.5 ²	26.69 ⁶⁴	62.1 ³	19.24 ¹⁶	68.0
27.2	5.32 ³⁰	73.9 ¹	28.28 ⁴¹	27.2 ³	26.04 ⁶⁵	61.9 ²	19.07 ¹⁷	68.1
Oct. 7.2	5.03 ²⁹	73.2 ⁷	27.87 ⁴¹	26.5 ⁷	25.40 ⁶⁴	61.1 ⁸	18.90 ¹⁷	67.9
17.2	4.76 ²⁷	72.0 ¹⁶	27.50 ³⁷	25.3 ¹²	24.80 ⁶⁰	59.8 ¹³	18.75 ¹⁵	67.5
27.1	4.52	70.4	27.19	23.8	24.24	58.0	18.63	66.8
Nov. 6.1	4.32 ²⁰	68.3 ²¹	26.96 ²³	21.9 ¹⁹	23.75 ⁴⁹	55.8 ²²	18.54 ⁹	66.0
16.1	4.16 ¹⁶	65.9 ²⁴	26.81 ¹⁵	19.7 ²²	23.35 ⁴⁰	53.1 ²⁷	18.48 ⁶	64.9
26.1	4.07 ⁹	63.0 ²⁹	26.76 ⁵	17.4 ²³	23.04 ³¹	50.0 ³¹	18.47 ¹	63.6
Dec. 6.0	4.03 ⁴	59.9 ³¹	26.82 ⁶	15.0 ²⁴	22.83 ²¹	46.7 ³³	18.51 ⁴	62.2
16.0	4.06	56.6	26.99	12.5	22.75	43.2	18.60	60.6
26.0	4.14 ⁸	53.2 ³⁴	27.25 ²⁶	10.1 ²⁴	22.78 ³	39.6 ³⁶	18.73 ¹³	58.9
35.9	4.30 ¹⁶	49.9 ³³	27.62 ³⁷	7.9 ²²	22.92 ¹⁴	36.0 ³⁶	18.90 ¹⁷	57.1
Sec δ , Tan δ	1.441	+1.037	2.339	-2.114	2.765	+2.577	1.003	+0.080
Mean Place	3 ^h .939	63 ^m .81	23 ^h .156	4 ^m .07	26 ^h .848	50 ^m .32	16 ^h .387	67 ^m .10
D ψ α , D ω α	-0.03	+0.01	+0.05	-0.01	-0.07	+0.02	0.00	0.00
D ψ δ , D ω δ	0.0	-1.0	0.0	-1.0	0.0	-1.0	0.0	-1.0

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	α^1 Scorpii. Mag. 3.1		μ Herculis. Mag. 3.5		ψ Draconis. Mag. 4.9		γ Ophiuchi. Mag. 3.7	
	Right Ascension.	Declination S.	Right Ascension.	Declination N.	Right Ascension.	Declination N.	Right Ascension.	Declination N.
	h m s	° ' "	h m s	° ' "	h m s	° ' "	h m s	° ' "
	17 41	-40 5	17 43	+27 45	17 43	+72 10	17 43	+2 44
Jan. 1.0	37.37	48.1	6.83	59.8	22.39	74.6	37.02	9.1
10.9	37.63 ²⁶	47.2 9	7.01 ¹⁸	57.0 ²⁸	22.61 ²²	71.0 ³⁶	37.22 ²⁰	7.5 ¹⁶
20.9	37.94 ³¹	46.5 7	7.23 ²²	54.3 ²⁷	22.96 ³⁵	67.7 ³³	37.45 ²³	5.9 ¹⁵
30.9	38.28 ³⁴	46.0 5	7.48 ²⁵	51.9 ²⁴	23.43 ⁴⁷	64.8 ²⁹	37.70 ²⁵	4.4 ¹³
Feb. 9.9	38.65 ³⁷	45.6 4	7.76 ²⁸	49.8 ²¹	24.00 ⁵⁷	62.3 ²⁵	37.97 ²⁷	3.1 ¹⁰
19.8	39.03 ³⁸	45.4 2	8.06 ³⁰	48.1 ¹⁷	24.64 ⁶⁴	60.3 ²⁰	38.26 ²⁹	2.1 8
Mar. 1.8	39.42 ³⁹	45.3 1	8.37 ³¹	46.9 ¹²	25.35 ⁷¹	58.9 ¹⁴	38.55 ²⁹	1.3 5
11.8	39.82 ⁴⁰	45.3 0	8.69 ³²	46.3 ⁶	26.09 ⁷⁴	58.2 ⁷	38.86 ³¹	0.8 1
21.7	40.22 ⁴⁰	45.4 1	9.00 ³¹	46.2 ¹	26.84 ⁷⁵	58.2 ⁰	39.16 ³⁰	0.7 2
31.7	40.61 ³⁹	45.6 2	9.31 ³¹	46.6 ⁴	27.57 ⁷³	58.8 ⁶	39.45 ²⁹	0.9 6
Apr. 10.7	41.00 ³⁹	46.0 4	9.61 ³⁰	47.5 ⁹	28.26 ⁶⁹	60.0 ¹²	39.74 ²⁹	1.5 8
20.7	41.36 ³⁶	46.4 4	9.90 ²⁹	48.9 ¹⁴	28.90 ⁶⁴	61.9 ¹⁹	40.02 ²⁸	2.3 8
30.6	41.71 ³⁵	46.9 5	10.17 ²⁷	50.7 ¹⁸	29.45 ⁵⁵	64.2 ²³	40.28 ²⁶	3.4 11
May 10.6	42.03 ³²	47.6 7	10.41 ²⁴	52.8 ²¹	29.91 ⁴⁶	67.0 ²⁸	40.52 ²⁴	4.6 12
20.6	42.32 ²⁶	48.3 8	10.62 ²¹	55.2 ²⁴	30.27 ³⁶	70.1 ³¹	40.73 ²¹	6.0 14
30.6	42.58 ²²	49.1 9	10.79 ¹⁴	57.8 ²⁷	30.51 ¹²	73.3 ³⁴	40.92 ¹⁶	7.5 15
June 9.5	42.80 ¹⁷	50.0 9	10.93 ¹¹	60.5 ²⁶	30.63 ¹²	76.7 ³⁴	41.08 ¹⁶	9.1 16
19.5	42.97 ¹²	50.9 10	11.04 ⁶	63.1 ²⁶	30.63 ⁰	80.2 ³⁵	41.21 ¹³	10.6 15
29.5	43.09 ⁷	51.9 10	11.10 ¹	65.7 ²⁵	30.51 ¹²	83.5 ³³	41.30 ⁹	12.1 15
July 9.4	43.16 ²	52.9 10	11.11 ²	68.2 ²²	30.27 ³⁵	86.6 ³¹	41.35 ¹	13.5 12
19.4	43.18 ³	53.9 9	11.09 ⁷	70.4 ²¹	29.92 ⁴⁶	89.6 ²⁶	41.36 ⁴	14.7 11
29.4	43.15 ⁸	54.8 7	11.02 ¹¹	72.5 ¹⁷	29.46 ⁵⁵	92.2 ²²	41.32 ⁶	15.8 10
Aug. 8.4	43.07 ¹³	55.5 7	10.91 ¹⁴	74.2 ¹⁴	28.91 ⁶³	94.4 ¹⁹	41.26 ¹⁰	16.8 8
18.3	42.94 ¹⁷	56.2 5	10.77 ¹⁷	75.6 ¹²	28.28 ⁷⁰	96.3 ¹³	41.16 ¹³	17.6 6
28.3	42.77 ¹⁹	56.7 3	10.60 ²⁰	76.8 ⁷	27.58 ⁷⁴	97.6 ⁹	41.03 ¹⁵	18.2 5
Sept. 7.3	42.58 ²¹	57.0 0	10.40 ²¹	77.5 ³	26.84 ⁷⁷	98.5 ⁴	40.88 ¹⁷	18.7 2
17.3	42.37 ²¹	57.0 2	10.19 ²¹	77.8 ¹	26.07 ⁷⁸	98.9 ²	40.71 ¹⁷	18.9 0
27.2	42.16 ²¹	56.8 4	9.98 ²¹	77.7 ⁴	25.29 ⁷⁷	98.7 ⁷	40.54 ¹⁶	18.9 1
Oct. 7.2	41.95 ¹⁹	56.4 6	9.77 ²¹	77.3 ⁹	24.52 ⁷⁴	98.0 ¹²	40.38 ¹⁵	18.8 4
17.2	41.76 ¹⁵	55.8 8	9.58 ¹⁷	76.4 ¹³	23.78 ⁶⁸	96.8 ¹⁷	40.23 ¹³	18.4 6
27.1	41.61 ¹¹	55.0 10	9.41 ¹³	75.1 ¹⁶	23.10 ⁶¹	95.1 ²²	40.10 ⁹	17.8 7
Nov. 6.1	41.50 ⁶	54.0 11	9.28 ¹⁰	73.5 ²⁰	22.49 ⁵²	92.9 ³⁰	40.01 ⁶	17.1 10
16.1	41.44 ⁰	52.9 12	9.18 ⁵	71.5 ²³	21.97 ⁴⁰	90.3 ²⁶	39.95 ¹	16.1 12
26.1	41.44 ⁶	51.7 11	9.13 ¹	69.2 ²⁵	21.57 ²⁸	87.3 ³³	39.94 ⁴	14.9 13
Dec. 6.0	41.50 ¹²	50.6 11	9.14 ⁵	66.7 ²⁷	21.29 ¹⁵	84.0 ³⁵	39.98 ⁸	13.6 15
16.0	41.62 ¹⁸	49.5 11	9.19 ¹⁰	64.0 ²⁸	21.14 ¹	80.5 ³⁶	40.06 ¹³	12.1 16
26.0	41.80 ²³	48.4 9	9.29 ¹⁵	61.2 ²⁹	21.13 ¹³	76.9 ³⁵	40.19 ¹⁷	10.5 16
35.9	42.03 ²³	47.5 9	9.44 ¹⁵	58.3 ²⁹	21.26 ¹³	73.4 ³⁵	40.36 ¹⁷	8.9 16
Sec δ , Tan δ	1.307	-0.842	1.130	+0.527	3.269	+3.112	1.001	+0.048
Mean Place	38°.363	42''.51	7°.878	70''.86	26°.806	87''.12	37°.798	18''.38
$D\alpha$, D_α	+0.02	0.00	-0.01	0.00	-0.68	+0.01	0.00	0.00
$D\delta$, D_δ	0.0	-1.0	0.0	-1.0	0.0	-1.0	0.0	-1.0

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	89 Herculis. Mag. 5.5		ξ Draconis. Mag. 3.9		35 Draconis. Mag. 5.0		θ Herculis. Mag. 4.0	
	Right Ascension.	Declination N.	Right Ascension.	Declination N.	Right Ascension.	Declination N.	Right Ascension.	Declination N.
	h m	° '	h m	° '	h m	° '	h m	° '
	17 51	+26 3	17 52	+56 52	17 53	+76 58	17 53	+37 15
Jan. 1.0	58.43 ^s	35.6	1.38 ^s	56.9	8.82 ^s	17.8	18.97 ^s	29.1
10.9	58.60 ¹⁷	32.9 ²⁷	1.55 ¹⁷	53.4 ³⁵	9.03 ²¹	14.4 ³⁴	19.14 ¹⁷	26.0 ³¹
20.9	58.81 ²¹	30.3 ²⁶	1.79 ²⁴	50.1 ³³	9.42 ³⁹	11.1 ³³	19.35 ²¹	23.1 ²⁹
30.9	59.06 ²⁵	27.9 ²⁴	2.09 ³⁰	47.1 ³⁰	9.98 ⁵⁰	8.1 ²⁵	19.60 ²⁵	20.4 ²⁷
Feb. 9.9	59.33 ²⁷	25.9 ²⁰	2.45 ³⁶	44.5 ²⁶	10.68 ⁷⁰	5.5 ²⁶	19.88 ²⁸	18.1 ²³
19.8	59.62 ²⁹	24.3 ¹⁶	2.85 ⁴⁰	42.4 ²⁴	11.51 ⁸³	3.5 ²⁰	20.19 ³¹	16.2 ¹⁹
Mar. 1.8	59.93 ³¹	23.1 ¹²	3.28 ⁴³	41.0 ¹⁴	12.42 ⁹¹	2.0 ¹⁵	20.52 ³³	14.9 ¹³
11.8	60.24 ³¹	22.4 ⁷	3.72 ⁴⁴	40.2 ⁸	13.39 ⁹⁷	1.2 ⁸	20.86 ³⁴	14.1 ⁸
21.7	60.55 ³¹	22.2 ²	4.18 ⁴⁶	40.0 ²	14.38 ⁹⁹	1.1 ¹	21.20 ³⁴	14.0 ¹
31.7	60.86 ³¹	22.6 ⁴	4.63 ⁴⁵	40.5 ⁵	15.35 ⁹⁷	1.6 ⁵	21.53 ³³	14.4 ⁴
Apr. 10.7	61.16 ³⁰	23.5 ⁹	5.06 ⁴³	41.7 ¹²	16.28 ⁹³	2.7 ¹¹	21.86 ³³	15.4 ¹⁰
20.7	61.45 ²⁹	24.9 ¹⁴	5.46 ⁴⁰	43.4 ¹⁷	17.13 ⁸⁵	4.5 ¹⁸	22.17 ³¹	16.9 ¹⁵
30.6	61.72 ²⁷	26.7 ¹⁸	5.82 ³⁶	45.7 ²³	17.88 ⁷⁵	6.7 ²²	22.46 ²⁹	18.9 ²⁰
May 10.6	61.97 ²⁵	28.7 ²⁰	6.14 ³²	48.4 ²⁷	18.50 ⁶²	9.4 ²⁷	22.72 ²⁶	21.3 ²⁴
20.6	62.19 ²²	31.1 ²⁴	6.41 ²⁷	51.4 ³⁰	18.98 ⁴⁸	12.4 ³⁰	22.94 ²²	24.0 ²⁷
30.6	62.38 ¹⁹	33.6 ²⁵	6.61 ²⁰	54.6 ³²	19.31 ³³	15.7 ³³	23.13 ¹⁹	26.8 ²⁸
June 9.5	62.53 ¹⁵	36.2 ²⁶	6.76 ¹⁵	58.0 ³⁴	19.47 ¹⁶	19.0 ³³	23.28 ¹⁵	29.8 ³⁰
19.5	62.64 ¹¹	38.9 ²⁷	6.83 ⁷	61.4 ³⁴	19.46 ¹	22.4 ³⁴	23.38 ¹⁰	32.9 ³¹
29.5	62.71 ⁷	41.5 ²⁶	6.84 ¹	64.7 ³³	19.29 ¹⁷	25.8 ³⁴	23.44 ⁶	35.8 ²⁹
July 9.4	62.74 ¹	43.9 ²⁴	6.78 ⁶	67.9 ³²	18.96 ³²	29.0 ³²	23.45 ¹	38.7 ²⁹
19.4	62.73 ⁶	46.2 ²¹	6.65 ¹³	70.9 ³⁰	18.47 ⁴⁹	32.0 ³⁰	23.41 ⁴	41.3 ²⁶
29.4	62.67 ¹⁰	48.3 ¹⁸	6.46 ¹⁹	73.6 ²⁷	17.84 ⁶³	34.7 ²⁷	23.33 ⁸	43.7 ²⁴
Aug. 8.4	62.57 ¹³	50.1 ¹⁴	6.21 ²⁵	75.9 ²³	17.84 ⁷⁶	37.0 ²³	23.33 ¹³	45.7 ²¹
18.3	62.44 ¹³	51.5 ¹⁴	5.91 ³⁰	77.9 ²⁰	17.08 ⁸⁷	39.0 ²⁰	23.20 ¹⁷	48.8 ¹⁷
28.3	62.28 ¹⁶	52.7 ¹²	5.57 ³⁴	79.4 ¹⁵	16.21 ⁹⁶	40.5 ¹⁵	23.03 ²⁰	47.5 ¹³
Sept. 7.3	62.09 ¹⁹	53.5 ⁸	5.20 ³⁷	80.4 ¹⁰	15.25 ¹⁰²	42.0 ¹⁰	22.83 ²³	48.8 ¹⁰
17.3	61.89 ²⁰	53.9 ⁴	4.80 ⁴⁰	80.4 ⁵	14.23 ¹⁰⁷	41.5 ⁵	22.60 ²⁴	49.8 ⁵
27.2	61.68 ²¹	53.9 ⁰	4.40 ⁴⁰	80.9 ⁰	13.16 ¹⁰⁹	42.0 ⁰	22.36 ²⁵	50.3 ⁰
Oct. 7.2	61.48 ²⁰	53.6 ³	4.00 ⁴⁰	80.4 ⁵	12.07 ¹⁰⁹	42.0 ⁰	22.11 ²⁵	50.3 ⁰
17.2	61.29 ¹⁹	52.9 ⁷	3.62 ³⁸	79.4 ¹⁰	10.99 ¹⁰⁸	41.5 ⁵	21.87 ²⁴	49.9 ⁴
27.1	61.12 ¹⁷	51.7 ¹²	3.27 ³⁵	77.8 ¹⁶	9.95 ¹⁰⁴	40.5 ¹⁰	21.64 ²³	49.0 ⁹
Nov. 6.1	60.98 ¹⁴	50.2 ¹⁵	2.97 ³⁰	75.8 ²⁰	8.97 ⁹⁸	39.0 ¹⁵	21.43 ²¹	47.7 ¹⁸
16.1	60.89 ⁹	48.4 ¹⁸	2.72 ²⁵	73.3 ²⁵	8.09 ⁸⁸	36.9 ²¹	21.26 ¹⁷	45.9 ¹⁸
26.1	60.84 ⁵	46.3 ²¹	2.53 ¹⁹	70.5 ²⁸	7.32 ⁷⁷	34.5 ²⁴	21.13 ¹³	43.8 ¹¹
Dec. 6.0	60.83 ⁵	43.9 ²⁴	2.42 ¹¹	67.3 ³²	6.70 ⁶²	31.7 ²⁸	21.05 ⁸	41.3 ¹³
16.0	60.88 ¹⁰	41.3 ²⁷	2.39 ⁴	63.9 ³⁵	6.23 ⁴⁷	28.5 ³⁴	21.02 ²	38.5 ¹⁰
26.0	60.98 ¹⁰	38.6 ²⁷	2.43 ¹²	60.4 ³⁵	5.95 ²⁸	25.1 ³⁴	21.04 ⁸	35.5 ⁵
36.0	61.12 ¹⁴	35.8 ²⁸	2.55 ¹²	56.9 ³⁵	5.85 ¹⁰	21.6 ³⁵	21.12 ⁸	32.4 ³¹
					5.94 ⁹	18.1 ³⁵	21.26 ¹⁴	29.3 ³¹
Sec δ, Tan δ	1.113	+0.489	1.830	+1.533	4.436	+4.322	1.256	+0.761
Mean Place	59°.469	46''.13	3°.608	68''.48	15°.179	29''.41	20°.263	40''.07
D'ψ a, Dω a	-0.01	0.00	-0.04	0.00	-0.11	+0.01	-0.02	0.00
Dψ δ, Dω δ	0.0	-1.0	0.0	-1.0	0.0	-1.0	0.0	-1.0

FOR THE UPPER TRANSIT AT WASHINGTON.

γ Ophiuchi. Mag. 3.5		ξ Herculis. Mag. 3.8		γ Draconis. Mag. 2.4		67 Ophiuchi. Mag. 3.9	
Right Ascension.	Declina- tion S.	Right Ascension.	Declina- tion N.	Right Ascension.	Declina- tion N.	Right Ascension.	Declina- tion N.
h m	° '	h m	° '	h m	° '	h m	° '
17 54	— 9 45	17 54	+ 29 14	17 54	+ 51 29	17 56	+ 2 55
s	"	s	"	s	"	s	"
20.04	58.9	26.61	72.4	36.05	43.1	22.50	56.3
20.23 ¹⁹	59.8 ⁹	26.78 ¹⁷	69.5 ²⁹	36.22 ¹⁷	39.6 ³⁵	22.68 ¹⁸	54.7 ¹⁶
20.46 ²³	60.7 ⁹	26.99 ²¹	66.8 ²⁷	36.44 ²²	36.4 ³²	22.90 ²²	53.1 ¹⁶
20.72 ²⁶	61.6 ⁹	27.23 ²⁴	64.3 ²⁵	36.72 ²⁸	33.4 ³⁰	23.14 ²⁴	51.6 ¹⁵
20.99 ²⁷	62.4 ⁸	27.50 ²⁷	62.2 ²¹	37.04 ³²	30.9 ²⁵	23.41 ²⁷	50.4 ¹²
21.29 ³⁰	63.0	27.80 ³⁰	60.5 ¹⁷	37.40 ³⁶	28.8 ²¹	23.69 ²⁸	49.3 ¹¹
21.59 ³⁰	63.5 ⁵	28.11 ³¹	59.2 ¹³	37.79 ³⁹	27.4 ¹⁴	23.98 ²⁹	48.6 ⁷
21.90 ³¹	63.8 ³	28.42 ³¹	58.5 ⁷	38.19 ⁴⁰	26.5 ⁹	24.28 ³⁰	48.1 ⁵
22.21 ³¹	63.8 ⁰	28.74 ³²	58.4 ¹	38.60 ⁴¹	26.3 ²	24.58 ³⁰	48.0 ¹
22.52 ³¹	63.7 ¹	29.06 ³²	58.8 ⁴	39.01 ⁴¹	26.8 ⁵	24.88 ³⁰	48.3 ³
22.82 ³⁰	63.4	29.37 ³¹	59.7 ⁹	39.40 ³⁹	27.9 ¹¹	25.17 ²⁹	48.8 ⁵
23.11 ²⁹	62.9 ⁵	29.66 ²⁹	61.1 ¹⁴	39.77 ³⁷	29.6 ¹⁷	25.45 ²⁸	49.7 ⁹
23.38 ²⁷	62.2 ⁷	29.94 ²⁸	62.9 ¹⁸	40.10 ³³	31.8 ²²	25.72 ²⁷	50.8 ¹¹
23.64 ²⁶	61.4 ⁸	30.19 ²⁵	65.1 ²²	40.40 ³⁰	34.4 ²⁶	25.97 ²⁵	52.1 ¹³
23.88 ²⁴	60.5 ⁹	30.41 ²²	67.6 ²⁵	40.65 ²⁵	37.3 ²⁹	26.19 ²²	53.5 ¹⁴
24.09 ²¹	59.6 ⁹	30.60 ¹⁹	70.2 ²⁶	40.85 ²⁰	40.5 ³²	26.39 ²⁰	55.1 ¹⁶
24.27 ¹⁸	58.7 ⁹	30.76 ¹⁶	72.9 ²⁷	41.00 ¹⁵	43.8 ³³	26.56 ¹⁷	56.7 ¹⁶
24.42 ¹⁵	57.9 ⁸	30.87 ¹¹	75.7 ²⁸	41.08 ⁸	47.1 ³³	26.70 ¹⁴	58.3 ¹⁶
24.53 ¹¹	57.1 ⁸	30.94 ⁷	78.4 ²⁷	41.11 ³	50.4 ³³	26.80 ¹⁰	59.8 ¹⁵
24.59 ⁶	56.3 ⁸	30.96 ²	81.0 ²⁶	41.08 ³	53.6 ³²	26.86 ⁶	61.2 ¹⁴
24.62 ³	55.7 ⁶	30.96 ²	83.4 ²⁴	41.08 ⁹	56.5 ²⁹	26.86 ²	62.5 ¹³
24.61 ¹	55.1 ⁶	30.94 ⁶	85.6 ²²	40.99 ¹⁵	59.2 ²⁷	26.88 ²	63.7 ¹²
24.55 ⁶	54.6 ⁵	30.88 ⁶	87.4 ¹⁸	40.84 ¹⁵	61.5 ²³	26.86 ²	64.7 ¹⁰
24.46 ⁹	54.2 ⁴	30.78 ¹⁰	89.0 ¹⁶	40.64 ²⁰	63.4 ¹⁹	26.80 ⁶	65.6 ⁹
24.34 ¹²	53.9 ³	30.64 ¹⁷	90.3 ¹³	40.39 ²⁵	64.9 ¹⁵	26.71 ¹³	66.2 ⁶
24.20 ¹⁴	53.7 ²	30.47 ²⁰	91.1 ⁸	40.10 ²⁹	66.0 ¹¹	26.58 ¹⁵	66.7 ⁵
24.04 ¹⁶	53.5 ²	30.27 ²¹	91.6 ⁵	39.79 ³⁴	66.5 ⁵	26.43 ¹⁶	67.0 ³
23.87 ¹⁷	53.5 ⁰	30.06 ²¹	91.6 ⁰	39.45 ³⁴	66.5 ⁰	26.27 ¹⁷	67.0 ⁰
23.71 ¹⁶	53.5 ⁰	29.85 ²²	91.6 ³	39.11 ³⁴	66.5 ⁴	26.10 ¹⁷	67.0 ¹
23.56 ¹⁵	53.6 ¹	29.63 ²⁰	91.3 ⁸	38.77 ³²	66.1 ¹⁰	25.93 ¹⁷	66.9 ³
23.43 ¹³	53.8 ²	29.43 ¹⁷	90.5 ¹²	38.45 ³⁰	65.1 ¹⁵	25.78 ¹⁵	66.6 ⁶
23.34 ⁹	54.0 ²	29.26 ¹⁵	89.3 ¹⁶	38.15 ²⁵	63.6 ¹⁹	25.65 ¹⁰	66.0 ⁷
23.34 ⁵	54.4 ⁴	29.11 ¹¹	87.7 ¹⁹	37.90 ²¹	61.7 ²⁴	25.55 ⁷	65.3 ⁹
23.29 ²	54.9 ⁵	29.00 ⁶	85.8 ²²	37.69 ¹⁵	59.3 ²⁸	25.48 ²	64.4 ¹²
23.27 ⁴	55.5 ⁶	28.94 ¹	83.6 ²⁵	37.54 ⁸	56.5 ³¹	25.46 ³	63.2 ¹³
23.31 ⁸	56.2 ⁷	28.93 ⁴	81.1 ²⁷	37.46 ²	53.4 ³³	25.49 ⁷	61.9 ¹⁴
23.39 ¹³	57.0 ⁸	28.97 ⁹	78.4 ²⁸	37.44 ⁵	50.1 ³⁴	25.56 ¹¹	60.5 ¹⁶
23.52 ¹⁷	57.9 ⁹	29.06 ¹⁴	75.6 ²⁹	37.49 ¹³	46.7 ³⁵	25.67 ¹⁶	58.9 ¹⁶
23.69		29.20	72.7	37.62	43.2	25.83	57.3
1.015	—0.172	1.146	+0.560	1.606	+1.257	1.001	+0.051
20 ^s .790	50 ^{''} .71	27 ^s .714	82 ^{''} .89	37 ^s .932	54 ^{''} .34	23 ^s .292	65 ^{''} .30
0.00	0.00	—0.01	0.00	—0.03	0.00	0.00	0.00
0.0	—1.0	0.0	—1.0	0.0	—1.0	0.0	—1.0

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	θ Arw. Mag. 3.9		γ Sagittarii. Mag. 3.1		70 Ophiuchi. Mag. 4.1		72 Ophiuchi. Mag. 3.7	
	Right Ascension.	Declination S.	Right Ascension.	Declination S.	Right Ascension.	Declination N.	Right Ascension.	Declination N.
	h m	° '	h m	° '	h m	° '	h m	° '
	17 59	-50 5	18 0	-30 25	18 1	+ 2 30	18 3	+ 0 30
	s	"	s	"	s	"	s	"
Jan. 1.0	59.58	60.4	19.92	41.1	8.70	57.0	18.31	54.5
10.9	59.86 ²⁸	58.9 ¹⁵	20.15 ²³	40.8 ³	8.88 ¹⁸	55.4 ¹⁶	18.48 ¹⁷	52.5 ²⁰
20.9	60.19 ³³	57.5 ¹⁴	20.40 ²⁵	40.5 ³	9.09 ²¹	53.8 ¹⁶	18.69 ²¹	50.6 ¹⁹
30.9	60.57 ³⁸	56.4 ¹¹	20.69 ²⁹	40.3 ²	9.33 ²⁴	52.4 ¹⁴	18.92 ²³	48.9 ¹⁷
Feb. 9.9	60.97 ⁴⁰	55.4 ¹⁰	21.01 ³²	40.1 ²	9.59 ²⁶	51.1 ¹³	19.18 ²⁶	47.4 ¹³
	44	8	33	1	28	10	28	13
19.8	61.41	54.6	21.34	40.0	9.87	50.1	19.46	46.1
Mar. 1.8	61.86 ⁴⁵	54.1 ⁵	21.69 ³⁵	39.9 ¹	10.16 ²⁹	49.3 ⁸	19.74 ²⁸	45.2 ⁸
11.8	62.32 ⁴⁶	53.7 ⁴	22.04 ³⁵	39.9 ⁰	10.46 ³⁰	48.8 ⁵	20.04 ³⁰	44.7 ⁵
21.8	62.79 ⁴⁷	53.6 ¹	22.40 ³⁶	39.8 ⁰	10.76 ³⁰	48.7 ¹	20.34 ³⁰	44.6 ³
31.7	63.26 ⁴⁷	53.7 ²	22.75 ³⁵	39.8 ⁰	11.06 ³⁰	48.9 ²	20.64 ³⁰	44.9 ³
	45	2	35	0	30	5	29	6
Apr. 10.7	63.71	53.9	23.10	39.8	11.36	49.4	20.93	45.5
20.7	64.15 ⁴⁴	54.4 ⁵	23.44 ³⁴	39.8 ⁰	11.64 ²⁸	50.2 ⁸	21.21 ²⁸	46.5 ¹⁰
30.6	64.57 ⁴²	55.1 ⁷	23.76 ³²	39.8 ⁰	11.91 ²⁷	51.3 ¹¹	21.48 ²⁷	47.8 ¹³
May 10.6	64.96 ³⁹	55.9 ⁸	24.06 ³⁰	39.8 ⁰	12.16 ²⁵	52.6 ¹³	21.74 ²⁶	49.4 ¹⁶
20.6	65.32 ³⁶	56.9 ¹⁰	24.34 ²⁸	39.9 ¹	12.39 ²³	54.0 ¹⁴	21.97 ²³	51.1 ¹⁷
	32	12	25	2	21	15	20	19
30.6	65.64	58.1	24.59	40.1	12.60	55.5	22.17	53.0
June 9.5	65.91 ²⁷	59.5 ¹⁴	24.81 ²²	40.4 ³	12.78 ¹⁸	57.1 ¹⁶	22.34 ¹⁷	55.0 ²⁰
19.5	66.13 ²²	60.9 ¹⁴	24.98 ¹⁷	40.7 ³	12.92 ¹⁴	58.6 ¹⁵	22.48 ¹⁴	56.9 ¹⁹
29.5	66.29 ¹⁶	62.4 ¹⁵	25.11 ¹³	41.1 ⁴	13.02 ¹⁰	60.1 ¹⁵	22.58 ¹⁰	58.8 ¹⁹
July 9.5	66.38 ⁹	63.9 ¹⁵	25.20 ⁹	41.5 ⁴	13.09 ⁷	61.5 ¹⁴	22.64 ⁶	60.6 ¹⁸
	4	15	4	5	2	13	2	17
19.4	66.42	65.4	25.24	42.0	13.11	62.8	22.66	62.3
29.4	66.39 ³	66.8 ¹⁴	25.23 ¹	42.4 ⁴	13.10 ¹	63.9 ¹¹	22.63 ³	63.8 ¹⁵
Aug. 8.4	66.30 ⁹	68.1 ¹³	25.18 ⁵	42.9 ⁵	13.04 ⁶	64.9 ¹⁰	22.57 ⁶	65.1 ¹³
18.3	66.16 ¹⁴	69.2 ¹¹	25.08 ¹⁰	43.3 ⁴	12.95 ⁹	65.7 ⁸	22.47 ¹⁰	66.2 ¹¹
28.3	65.97 ¹⁹	70.0 ⁸	24.95 ¹³	43.6 ³	12.83 ¹²	66.4 ⁷	22.34 ¹³	67.0 ⁸
	23	6	16	2	15	4	15	6
Sept. 7.3	65.74	70.6	24.79	43.8	12.68	66.8	22.19	67.6
17.3	65.49 ²⁵	70.9 ³	24.61 ¹⁸	43.9 ¹	12.52 ¹⁶	67.0 ²	22.03 ¹⁶	68.0 ⁴
27.2	65.22 ²⁷	70.9 ⁰	24.42 ¹⁹	43.9 ⁰	12.35 ¹⁷	67.1 ¹	21.85 ¹⁸	68.1 ¹
Oct. 7.2	64.96 ²⁶	70.6 ³	24.23 ¹⁹	43.7 ²	12.19 ¹⁶	67.0 ¹	21.68 ¹⁷	67.9 ²
17.2	64.72 ²⁴	69.9 ⁷	24.06 ¹⁷	43.4 ³	12.03 ¹⁶	66.6 ⁴	21.52 ¹⁶	67.5 ⁴
	21	10	14	4	13	5	15	7
27.2	64.51	68.9	23.92	43.0	11.90	66.1	21.37	66.8
Nov. 6.1	64.35 ¹⁶	67.7 ¹²	23.81 ¹¹	42.5 ⁵	11.80 ¹⁰	65.3 ⁸	21.26 ¹¹	65.9 ⁹
16.1	64.25 ¹⁰	66.2 ¹⁵	23.74 ⁷	41.9 ⁶	11.73 ⁷	64.4 ⁹	21.18 ⁸	64.7 ¹²
26.1	64.21 ⁴	64.6 ¹⁶	23.73 ¹	41.3 ⁶	11.71 ²	63.3 ¹¹	21.15 ³	63.3 ¹⁴
Dec. 6.0	64.24 ³	62.9 ¹⁷	23.76 ³	40.7 ⁶	11.73 ²	62.0 ¹³	21.16 ¹	61.7 ¹⁶
	11	17	9	6	6	15	6	18
16.0	64.35	61.2	23.85	40.1	11.79	60.5	21.22	59.9
26.0	64.52 ¹⁷	59.5 ¹⁷	24.00 ¹⁵	39.6 ⁵	11.90 ¹¹	59.0 ¹⁵	21.32 ¹⁰	58.0 ¹⁹
36.0	64.76 ²⁴	57.9 ¹⁶	24.19 ¹⁹	39.2 ⁴	12.06 ¹⁶	57.4 ¹⁶	21.46 ¹⁴	56.1 ¹⁹
Sec δ , Tan δ	1.559	-1.196	1.160	-0.587	1.001	+0.044	1.014	+0.168
Mean Place	60°.826	54'".70	20°.778	34'".24	9°.496	65'".91	19°.161	63'".65
$D'\psi a$, $D_w a$	+0.03	0.00	+0.02	0.00	0.00	0.00	0.00	0.00
$D\psi \delta$, $D_w \delta$	0.0	-1.0	0.0	-1.0	0.0	-1.0	0.0	-1.0

FOR THE UPPER TRANSIT AT WASHINGTON.

n Solar Date.	o Heroulis. Mag. 3.8		μ Sagittarii. Mag. 4.0		η Sagittarii. Mag. 3.2		Groombridge 2533. Mag. 5.4	
	Right Ascension.	Declination N.	Right Ascension.	Declination S.	Right Ascension.	Declination S.	Right Ascension.	Declination N.
	h m 18 4	° ' " +28 44	h m 18 8	° ' " -21 4	h m 18 11	° ' " -36 47	h m 18 12	° ' " +42 7
l. 1.0	12.47	50.2	39.98	63.0	51.65	23.8	58.61	37.6
11.0	12.62	47.4	40.18	63.1	51.87	23.0	58.75	34.4
20.9	12.82	44.7	40.41	63.3	52.13	22.3	58.94	31.3
30.9	13.05	42.3	40.67	63.5	52.43	21.7	59.18	28.4
b. 9.9	13.32	40.1	40.96	63.7	52.76	21.1	59.45	25.9
19.8	13.61	38.4	41.26	63.9	53.11	20.7	59.76	23.9
r. 1.8	13.91	37.1	41.58	64.0	53.47	20.3	60.09	22.3
11.8	14.22	36.4	41.91	64.0	53.85	20.1	60.44	21.4
21.8	14.54	36.1	42.23	63.9	54.22	19.9	60.80	21.1
31.7	14.86	36.5	42.56	63.8	54.60	19.7	61.15	21.4
r. 10.7	15.17	37.3	42.89	63.5	54.98	19.7	61.50	22.3
20.7	15.47	38.7	43.20	63.2	55.34	19.7	61.84	23.7
30.7	15.75	40.5	43.50	62.8	55.70	19.8	62.15	25.7
y 10.6	16.01	42.6	43.79	62.5	56.03	20.0	62.44	28.0
20.6	16.24	45.0	44.05	62.1	56.34	20.4	62.69	30.7
30.6	16.43	47.6	44.29	61.7	56.61	20.8	62.91	33.7
ne 9.5	16.60	50.4	44.50	61.4	56.85	21.3	63.08	36.9
19.5	16.72	53.1	44.67	61.1	57.05	22.0	63.20	40.1
29.5	16.80	55.9	44.80	60.9	57.21	22.7	63.27	43.2
ly 9.5	16.84	58.5	44.89	60.8	57.31	23.5	63.29	46.3
19.4	16.83	60.9	44.94	60.7	57.36	24.3	63.26	49.2
29.4	16.77	63.2	44.94	60.7	57.36	25.1	63.18	51.8
g. 8.4	16.68	65.1	44.89	60.7	57.31	25.8	63.05	54.2
18.4	16.55	66.8	44.81	60.8	57.21	26.5	62.87	56.2
28.3	16.38	68.1	44.69	60.8	57.08	27.1	62.66	57.8
pt. 7.3	16.19	69.0	44.55	60.8	56.91	27.5	62.42	59.0
17.3	15.99	69.5	44.39	60.8	56.71	27.7	62.16	59.7
27.2	15.77	69.7	44.21	60.8	56.51	27.8	61.88	60.0
t. 7.2	15.56	69.4	44.04	60.8	56.30	27.6	61.61	59.8
17.2	15.36	68.8	43.88	60.7	56.11	27.3	61.35	59.1
27.2	15.18	67.7	43.74	60.5	55.95	26.8	61.11	57.9
v. 6.1	15.03	66.2	43.64	60.4	55.82	26.1	60.90	56.3
16.1	14.91	64.4	43.57	60.3	55.74	25.2	60.73	54.2
26.1	14.84	62.2	43.55	60.2	55.70	24.3	60.61	51.8
c. 6.1	14.82	59.8	43.58	60.1	55.73	23.4	60.55	49.0
16.0	14.85	57.2	43.66	60.1	55.81	22.4	60.54	46.0
26.0	14.93	54.4	43.78	60.1	55.94	21.5	60.59	42.8
36.0	15.06	51.6	43.95	60.2	56.13	20.6	60.69	39.6
l, Tan δ	1.141	+0.549	1.072	-0.386	1.249	-0.748	1.348	+0.904
1 Place	13°.580	60''.20	40°.769	55''.37	52°.576	16''.92	60°.119	47''.25
l, D _∞ α	-0.01	0.00	+0.01	0.00	+0.02	0.00	-0.02	0.00
, D _∞ δ	0.0	-1.0	0.0	-1.0	0.0	-1.0	0.0	-1.0

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	36 Draconis. Mag. 5.0		δ Sagittarii. Mag. 2.8		η Serpentis. Mag. 3.4		ϵ Sagittarii. Mag. 2.0	
	Right Ascension.	Declination N.	Right Ascension.	Declination S.	Right Ascension.	Declination S.	Right Ascension.	Declination S.
	h m 18 13	° ' " +64 21	h m 18 15	° ' " -29 51	h m 18 16	° ' " -2 55	h m 18 18	° ' " -34 25
Jan. 1.0	21.32 ¹⁴	56.3 ³⁶	32.30 ²⁰	62.3 ⁴	53.86 ¹⁷	26.4 ¹³	30.90 ²¹	39.8 ⁷
11.0	21.46 ²²	52.7 ³⁴	32.50 ²⁴	61.9 ³	54.03 ²⁰	27.7 ¹²	31.11 ²⁵	39.1 ⁶
20.9	21.68 ³¹	49.3 ³¹	32.74 ²⁸	61.6 ³	54.23 ²³	28.9 ¹¹	31.36 ²⁹	38.5 ⁶
30.9	21.99 ³⁸	46.2 ²⁸	33.02 ³⁰	61.3 ³	54.46 ²⁵	30.0 ¹⁰	31.65 ³¹	37.9 ⁵
Feb. 9.9	22.37 ⁴⁵	43.4 ²³	33.32 ³²	61.0 ²	54.71 ²⁷	31.0 ⁸	31.96 ³³	37.4 ⁴
19.8	22.82 ⁵⁰	41.1 ¹⁷	33.64 ³⁴	60.8 ²	54.98 ²⁹	31.8 ⁶	32.29 ³⁵	37.0 ⁴
Mar. 1.8	23.32 ⁵³	39.4 ¹¹	33.98 ³⁵	60.6 ²	55.27 ²⁹	32.4 ³	32.64 ³⁶	36.6 ³
11.8	23.85 ⁵⁵	38.3 ⁴	34.33 ³⁵	60.4 ²	55.56 ³⁰	32.7 ¹	33.01 ³⁶	36.3 ²
21.8	24.40 ⁵⁵	37.9 ³	34.68 ³⁵	60.2 ²	55.86 ³¹	32.8 ³	33.37 ³⁷	36.1 ²
31.7	24.95 ⁵⁴	38.2 ⁹	35.03 ³⁵	60.0 ²	56.17 ³⁰	32.5 ⁵	33.74 ³⁷	35.9 ²
Apr. 10.7	25.49 ⁵⁰	39.1 ¹⁶	35.38 ³⁴	59.8 ¹	56.47 ²⁹	32.0 ⁷	34.11 ³⁶	35.7 ¹
20.7	25.99 ⁴⁷	40.7 ²¹	35.72 ³³	59.7 ²	56.76 ²⁸	31.3 ¹⁰	34.47 ³⁴	35.6 ⁰
30.7	26.46 ⁴¹	42.8 ²⁵	36.05 ³¹	59.5 ¹	57.04 ²⁶	30.3 ¹¹	34.81 ³³	35.6 ¹
May 10.6	26.87 ²⁷	45.3 ³²	36.36 ²⁶	59.4 ¹	57.30 ²²	29.2 ¹³	35.14 ²⁷	35.7 ³
20.6	27.21 ¹⁹	48.3 ¹⁶	36.65 ²⁶	59.4 ¹	57.55 ²²	28.0 ¹³	35.45 ²⁷	35.8 ³
30.6	27.48 ¹⁰	51.5 ³⁵	36.91 ¹⁹	59.5 ²	57.77 ¹⁶	26.7 ¹⁴	35.72 ²⁰	36.1 ⁶
June 9.5	27.67 ²	54.9 ³⁴	37.14 ¹⁵	59.6 ³	57.96 ¹²	25.4 ¹²	35.97 ¹⁵	36.5 ⁴
19.5	27.77 ⁷	58.4 ²⁹	37.33 ¹⁰	59.8 ⁴	58.12 ⁸	24.0 ¹¹	36.17 ¹⁴	36.9 ⁶
29.5	27.79 ¹⁵	61.8 ³²	37.48 ⁶	60.1 ⁴	58.24 ⁴	22.8 ¹¹	36.32 ¹¹	37.5 ⁶
July 9.5	27.72 ²⁴	65.2 ²⁹	37.58 ¹	60.5 ⁴	58.32 ⁰	21.6 ⁹	36.43 ¹	38.1 ⁷
19.4	27.57 ³¹	68.4 ²⁶	37.64 ⁴	60.9 ⁵	58.36 ⁴	20.5 ⁸	36.49 ⁴	38.8 ⁶
29.4	27.33 ³⁸	71.3 ¹⁸	37.65 ⁹	61.3 ²	58.36 ⁸	19.6 ⁴	36.50 ⁹	39.5 ⁶
Aug. 8.4	27.02 ⁴⁸	73.9 ¹³	37.61 ¹⁵	61.8 ²	58.32 ¹¹	18.8 ⁴	36.46 ¹⁶	40.1 ⁴
18.4	26.64 ¹³	76.2 ⁹	37.52 ¹²	62.2 ⁴	58.24 ¹⁴	18.1 ⁴	36.37 ¹³	40.7 ⁶
28.3	26.21 ⁴⁸	78.0 ¹³	37.40 ¹⁵	62.6 ²	58.13 ¹⁴	17.6 ⁴	36.24 ¹⁶	41.3 ⁴
Sept. 7.3	25.73 ⁵¹	79.3 ⁹	37.25 ¹⁸	62.8 ²	57.99 ¹⁶	17.2 ²	36.08 ¹⁸	41.7 ²
17.3	25.22 ⁵³	80.2 ³	37.07 ¹⁸	63.0 ⁰	57.83 ¹⁶	17.0 ¹	35.90 ²⁰	41.9 ¹
27.2	24.69 ⁵³	80.5 ²	36.89 ¹⁹	63.0 ¹	57.67 ¹⁷	16.9 ¹	35.70 ²⁰	42.0 ¹
Oct. 7.2	24.16 ⁵¹	80.3 ⁷	36.70 ¹⁸	62.9 ³	57.50 ¹³	17.0 ⁴	35.50 ¹⁶	41.9 ⁵
17.2	23.65 ⁴⁸	79.6 ¹³	36.52 ¹⁵	62.7 ³	57.34 ¹³	17.2 ⁴	35.31 ¹⁶	41.7 ⁵
27.2	23.17 ⁴⁴	78.3 ¹⁸	36.37 ¹²	62.4 ⁴	57.21 ¹¹	17.6 ⁵	35.15 ¹³	41.2 ⁵
Nov. 6.1	22.73 ³⁸	76.5 ²²	36.25 ⁸	62.0 ⁵	57.10 ⁸	18.1 ⁷	35.02 ⁸	40.7 ⁷
16.1	22.35 ³⁰	74.3 ²⁷	36.17 ³	61.5 ⁶	57.02 ⁹	18.8 ⁸	34.94 ⁴	40.0 ⁸
26.1	22.05 ²²	71.6 ³¹	36.14 ⁸	60.9 ⁵	56.99 ¹⁰	19.6 ¹⁰	34.90 ⁷	39.2 ⁹
Dec. 6.1	21.83 ¹²	68.5 ³³	36.16 ⁸	60.3 ⁵	57.00 ⁵	20.6 ¹⁰	34.92 ⁷	38.3 ⁸
16.0	21.71 ³	65.2 ³⁵	36.24 ¹³	59.8 ⁶	57.05 ¹⁰	21.6 ¹²	34.99 ¹³	37.5 ⁸
26.0	21.68 ⁷	61.7 ³⁵	36.37 ¹⁷	59.2 ⁴	57.15 ¹⁴	22.8 ¹²	35.12 ¹⁷	36.7 ⁸
36.0	21.75	58.2 ³⁵	36.54	58.8	57.29	24.0 ¹²	35.29 ¹⁷	35.9
Sec δ , Tan δ	2.312	+2.084	1.153	-0.574	1.001	-0.051	1.212	-0.685
Mean Place	24°.460	65°'.91	33°.142	55°'.00	54°.642	18°'.03	31°.792	32°'.56
D ψ α , D ω α	-0.06	-0.01	+0.02	0.00	0.00	0.00	+0.02	0.00
D ψ δ , D ω δ	0.0	-1.0	0.0	-1.0	0.0	-1.0	0.0	-1.0

FOR THE UPPER TRANSIT AT WASHINGTON.

an Solar Date.	109 Herculis. Mag. 3.9		α Telescopii. Mag. 3.8		χ Draconis. Mag. 3.7		λ Sagittarii. Mag. 2.9	
	Right Ascension.	Declina- tion N.	Right Ascension.	Declina- tion S.	Right Ascension.	Declina- tion N.	Right Ascension.	Declina- tion S.
	h m 18 20	° ' " + 21 43	h m 18 20	° ' " - 46 0	h m 18 22	° ' " + 72 41	h m 18 22	° ' " - 25 28
n. 1.0	3.51	39.7	39.17	66.1	30.57	37.6	42.70	18.9
11.0	3.66 ¹⁵	37.2 ²⁵	39.40 ²³	64.7 ¹⁴	30.67 ¹⁰	34.0 ³⁶	42.89 ¹⁹	18.7 ²
20.9	3.84 ¹⁸	34.8 ²⁴	39.69 ²⁹	63.4 ¹³	30.91 ²⁴	30.6 ³⁴	43.12 ²³	18.6 ¹
30.9	4.06 ²²	32.5 ²³	40.01 ³²	62.2 ¹²	31.28 ³⁷	27.4 ³²	43.37 ²⁵	18.5 ¹
b. 9.9	4.31 ²⁵	30.5 ²⁰	40.37 ³⁶	61.2 ¹⁰	31.77 ⁴⁹	24.6 ²⁸	43.66 ²⁹	18.4 ¹
19.9	4.58 ²⁷	28.9 ¹⁶	40.76 ³⁹	60.3 ⁹	32.36 ⁵⁹	22.2 ²⁴	43.96 ³⁰	18.3 ¹
ar. 1.8	4.87 ²⁹	27.7 ¹²	41.17 ⁴¹	59.6 ⁷	33.03 ⁶⁷	20.4 ¹⁸	44.28 ³²	18.1 ²
11.8	5.17 ³⁰	27.0 ⁷	41.60 ⁴³	59.0 ⁶	33.76 ⁷³	19.2 ¹²	44.61 ³³	18.0 ¹
21.8	5.47 ³⁰	26.7 ³	42.03 ⁴³	58.6 ⁴	34.52 ⁷⁶	18.7 ⁵	44.95 ³⁴	17.8 ²
31.7	5.78 ³¹	27.0 ³	42.46 ⁴³	58.4 ²	35.29 ⁷⁷	18.8 ¹	45.29 ³⁴	17.5 ³
or. 10.7	6.08 ³⁰	27.7 ⁷	42.89 ⁴³	58.4 ⁰	36.04 ⁷⁵	19.6 ⁸	45.63 ³⁴	17.2 ³
20.7	6.38 ³⁰	28.9 ¹²	43.31 ⁴²	58.5 ¹	36.75 ⁷¹	21.0 ¹⁴	45.96 ³³	16.9 ³
30.7	6.66 ²⁸	30.5 ¹⁶	43.71 ⁴⁰	58.8 ³	37.40 ⁶⁵	22.9 ¹⁹	46.28 ³²	16.6 ³
ay 10.6	6.93 ²⁷	32.4 ¹⁹	44.09 ³⁸	59.3 ⁵	37.96 ⁵⁶	25.4 ²⁵	46.58 ³⁰	16.3 ³
20.6	7.17 ²⁴	34.6 ²²	44.45 ³⁶	60.0 ⁷	38.43 ⁴⁷	28.2 ²⁸	46.87 ²⁹	16.0 ³
30.6	7.38 ²¹	36.9 ²³	44.77 ³²	60.8 ⁸	38.80 ³⁷	31.4 ³²	47.12 ²⁵	15.8 ²
ne 9.5	7.56 ¹⁸	39.4 ²⁵	45.05 ²⁸	61.7 ⁹	39.04 ²⁴	34.7 ³³	47.35 ²³	15.6 ²
19.5	7.71 ¹⁵	41.9 ²⁵	45.28 ²³	62.8 ¹¹	39.16 ¹²	38.2 ³⁵	47.54 ¹⁹	15.5 ¹
29.5	7.81 ¹⁰	44.4 ²⁵	45.46 ¹⁸	64.0 ¹²	39.16 ⁰	41.7 ³⁵	47.69 ¹⁵	15.6 ¹
ly 9.5	7.87 ⁶	46.8 ²⁴	45.58 ¹²	65.3 ¹³	39.02 ¹⁴	45.1 ³⁴	47.80 ¹¹	15.7 ¹
19.4	7.89 ²	49.1 ²¹	45.64 ¹	66.6 ¹³	38.77 ³⁷	48.3 ³⁰	47.86 ¹	15.8 ²
29.4	7.87 ⁷	51.2 ¹⁸	45.65 ⁶	67.9 ¹³	38.40 ⁴⁸	51.3 ²⁷	47.87 ³	16.0 ²
ig. 8.4	7.80 ¹⁰	53.0 ¹⁶	45.59 ¹¹	69.1 ¹¹	37.92 ⁵⁷	54.0 ²³	47.84 ⁸	16.3 ³
18.4	7.70 ¹⁴	54.6 ¹²	45.48 ¹⁵	70.2 ⁸	37.35 ⁶⁶	56.3 ²⁰	47.76 ¹¹	16.5 ²
28.3	7.56 ¹⁷	55.8 ⁹	45.33 ²⁰	71.0 ⁷	36.69 ⁷²	58.3 ¹⁴	47.65 ¹⁵	16.8 ²
ot. 7.3	7.39 ¹⁸	56.7 ⁶	45.13 ²³	71.7 ⁵	35.97 ⁷⁷	59.7 ¹⁰	47.50 ¹⁶	17.0 ¹
17.3	7.21 ¹⁹	57.3 ³	44.90 ²⁴	72.2 ²	35.20 ⁸⁰	60.7 ⁵	47.34 ¹⁸	17.1 ¹
27.2	7.02 ²⁰	57.6 ¹	44.66 ²⁴	72.4 ²	34.40 ⁸⁰	61.2 ⁰	47.16 ¹⁸	17.2 ¹
t. 7.2	6.82 ¹⁹	57.5 ⁵	44.42 ²³	72.2 ⁴	33.60 ⁷⁹	61.2 ¹²	46.98 ¹⁴	17.1 ²
17.2	6.63 ¹⁷	57.0 ⁸	44.19 ²⁰	71.8 ⁷	32.81 ⁷⁵	60.6 ¹²	46.81 ¹⁷	17.0 ²
27.2	6.46 ¹⁴	56.2 ¹²	43.99 ¹⁶	71.1 ⁹	32.06 ⁶⁹	59.4 ¹⁶	46.67 ¹²	16.8 ²
v. 6.1	6.32 ¹⁰	55.0 ¹⁶	43.83 ¹¹	70.2 ¹²	31.37 ⁶¹	57.8 ²¹	46.55 ⁸	16.6 ³
16.1	6.22 ⁷	53.4 ²¹	43.72 ⁶	69.0 ¹⁴	30.76 ⁵⁰	55.7 ²⁹	46.47 ⁴	16.3 ³
26.1	6.15 ²	51.6 ¹⁸	43.66 ¹	67.6 ¹⁵	30.24 ⁴²	53.1 ²⁶	46.43 ²	16.0 ³
z. 6.1	6.13 ²	49.5 ²²	43.67 ⁷	66.2 ¹⁵	29.84 ²⁷	50.2 ³³	46.45 ⁶	15.7 ³
16.0	6.15 ⁸	47.3 ²⁵	43.74 ¹⁴	64.7 ¹⁵	29.57 ¹³	46.9 ³⁴	46.51 ¹¹	15.4 ³
26.0	6.23 ¹²	44.8 ²⁵	43.88 ¹⁹	63.2 ¹⁵	29.44 ¹	43.5 ³⁵	46.62 ¹⁷	15.1 ²
36.0	6.35	42.3 ²⁵	44.07 ¹⁹	61.7 ¹⁵	29.45	40.0 ³⁵	46.79 ¹⁷	14.9 ²
Tan δ	1.076	+0.399	1.440	-1.036	3.362	+3.209	1.108	-0.476
Place	4°.529	48''.57	40°.265	59''.17	35°.509	46''.21	43°.506	11''.22
D _u α	-0.01	0.00	+0.03	+0.01	-0.08	-0.02	+0.01	0.00
D _u δ	0.0	-1.0	0.0	-1.0	0.0	-1.0	0.0	-1.0

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	c Serpentis. Mag. 5.4		1 Aquilæ. Mag. 4.1		ζ Pavonis. Mag. 4.1		α Lyre. (Vega.) Mag. 0.1	
	Right Ascension.	Declination S.	Right Ascension.	Declination S.	Right Ascension.	Declination S.	Right Ascension.	Declination N.
	h m 18 25	° ' " — 2 2	h m 18 30	° ' " — 8 18	h m 18 33	° ' " — 71 30	h m 18 34	° ' " + 38 41
Jan. 1.0	14.76 ^s	36.4 ^s	34.12 ^s	23.9 ^s	3.59 ^s	16.5 ^s	2.20 ^s	66.1 ^s
11.0	14.92 ¹⁶	37.7 ¹³	34.28 ¹⁶	24.8 ⁹	3.97 ³⁸	13.7 ²⁸	2.31 ¹¹	63.0 ³¹
20.9	15.12 ²⁰	38.9 ¹²	34.47 ¹⁹	25.6 ⁸	4.46 ⁴⁹	11.1 ²⁶	2.48 ¹⁷	60.0 ³⁰
30.9	15.34 ²²	40.0 ¹⁰	34.70 ²³	26.4 ⁸	5.05 ⁵⁹	8.7 ²⁴	2.69 ²¹	57.2 ²⁸
Feb. 9.9	15.59 ²⁵	41.0 ¹¹	34.95 ²⁵	27.1 ⁷	5.73 ⁶⁸	6.6 ²¹	2.94 ²⁵	54.7 ²⁵
	27	8	27	5	76	19	28	21
19.9	15.86 ²⁸	41.8 ⁶	35.22 ²⁹	27.6 ⁴	6.49 ⁸¹	4.7 ¹⁵	3.22 ³¹	52.6 ¹⁰
Mar. 1.8	16.14 ²⁹	42.4 ³	35.51 ²⁹	28.0 ¹	7.30 ⁸⁵	3.2 ¹¹	3.53 ³³	51.0 ¹¹
11.8	16.43 ³⁰	42.7 ⁰	35.80 ³¹	28.1 ⁰	8.15 ⁸⁸	2.1 ⁷	3.86 ³⁴	49.9 ⁴
21.8	16.73 ³⁰	42.7 ³	36.11 ³⁰	28.1 ³	9.03 ⁸⁸	1.4 ⁴	4.20 ³⁴	49.5 ¹
31.7	17.03 ³⁰	42.4 ⁵	36.41 ³¹	27.8 ⁵	9.91 ⁸⁸	1.0 ⁰	4.54 ³⁴	49.6 ⁷
Apr. 10.7	17.33 ³⁰	41.9 ⁸	36.72 ³⁰	27.3 ⁷	10.79 ⁸⁶	1.0 ⁴	4.88 ³⁴	50.3 ¹³
20.7	17.63 ²⁸	41.1 ¹⁰	37.02 ²⁹	26.6 ⁹	11.65 ⁸³	1.4 ⁸	5.22 ³²	51.6 ¹⁸
30.7	17.91 ²⁷	40.1 ¹²	37.31 ²⁸	25.7 ⁹	12.48 ⁷⁸	2.2 ¹²	5.54 ²⁹	53.4 ²²
May 10.6	18.18 ²⁵	38.9 ¹³	37.59 ²⁶	24.8 ¹¹	13.26 ⁷¹	3.4 ¹⁸	5.83 ²⁴	55.6 ²⁶
20.6	18.43 ²³	37.6 ¹⁴	37.85 ²⁴	23.7 ¹¹	13.97 ⁶⁴	4.8 ¹⁸	6.10 ²⁴	58.2 ²⁹
30.6	18.66 ²⁰	36.2 ¹⁵	38.09 ²¹	22.6 ¹¹	14.61 ⁵⁴	6.6 ²⁰	6.34 ¹⁹	61.1 ³⁰
June 9.6	18.86 ¹⁷	34.7 ¹⁴	38.30 ¹⁸	21.5 ¹¹	15.15 ⁴³	8.6 ²²	6.53 ¹⁵	64.1 ³²
19.5	19.03 ¹³	33.3 ¹³	38.48 ¹⁴	20.4 ¹⁰	15.58 ³³	10.8 ²⁴	6.68 ¹⁰	67.3 ³¹
29.5	19.16 ⁹	32.0 ¹³	38.62 ¹⁰	19.4 ⁹	15.91 ²⁰	13.2 ²⁵	6.78 ⁵	70.4 ³¹
July 9.5	19.25 ⁴	30.7 ¹²	38.72 ⁵	18.5 ⁹	16.11 ⁸	15.7 ²⁴	6.83 ⁰	73.5 ²⁹
19.4	19.29 ¹	29.5 ¹⁰	38.77 ²	17.6 ⁷	16.19 ⁵	18.1 ²⁴	6.83 ⁴	76.4 ²⁷
29.4	19.30 ⁴	28.5 ⁹	38.79 ³	16.9 ⁶	16.14 ¹⁸	20.5 ²³	6.79 ¹⁰	79.1 ²⁵
Aug. 8.4	19.26 ⁷	27.6 ⁷	38.76 ⁷	16.3 ⁴	15.96 ²⁸	22.8 ²⁰	6.69 ¹⁴	81.6 ²¹
18.4	19.19 ¹⁰	26.9 ⁶	38.69 ¹⁰	15.9 ⁴	15.68 ³⁹	24.8 ¹⁷	6.55 ¹⁸	83.7 ¹⁸
28.3	19.09 ¹⁴	26.3 ⁴	38.59 ¹³	15.5 ²	15.29 ⁴⁸	26.5 ¹³	6.37 ²¹	85.5 ¹³
Sept. 7.3	18.95 ¹⁵	25.9 ³	38.46 ¹⁵	15.3 ²	14.81 ⁵⁴	27.8 ⁹	6.16 ²⁴	86.8 ¹⁰
17.3	18.80 ¹⁷	25.6 ¹	38.31 ¹⁶	15.1 ⁰	14.27 ⁵⁷	28.7 ⁴	5.92 ²⁵	87.8 ⁵
27.3	18.63 ¹⁰	25.5 ¹	38.15 ¹⁷	15.1 ⁰	13.70 ⁵⁹	29.1 ¹	5.67 ²⁵	88.3 ⁰
Oct. 7.2	18.47 ¹⁶	25.8 ²	37.98 ¹⁰	15.2 ¹	13.11 ⁵⁷	29.0 ⁶	5.42 ²⁵	88.3 ⁴
17.2	18.31 ¹⁴	26.1 ³	37.82 ¹⁴	15.3 ³	12.54 ⁵³	28.4 ¹¹	5.17 ²³	87.9 ⁹
27.2	18.17 ¹²	26.6 ⁵	37.68 ¹¹	15.5 ³	12.01 ⁴⁵	27.3 ¹⁵	4.94 ²¹	87.0 ¹³
Nov. 6.1	18.05 ⁷	27.3 ⁷	37.57 ⁰	16.2 ⁴	11.56 ³⁶	25.8 ²⁰	4.73 ¹⁷	85.7 ¹⁸
16.1	17.98 ⁴	28.1 ⁸	37.48 ⁴	16.7 ⁵	11.20 ²⁵	23.8 ¹²	4.56 ¹²	83.9 ²²
26.1	17.94 ⁰	29.1 ¹⁰	37.45 ¹	17.4 ⁷	10.95 ¹⁵	21.5 ²⁶	4.44 ⁷	81.7 ²⁵
Dec. 6.1	17.94 ⁵	30.2 ¹¹	37.40 ⁰	18.1 ⁸	10.83 ²	18.9 ²⁸	4.37 ²	79.2 ²⁸
16.0	18.08 ⁰	31.3 ¹³	37.58 ⁰	18.9 ⁸	10.85 ¹⁵	16.1 ²⁸	4.35 ²	76.4 ³⁰
26.0	18.21 ¹³	32.0 ¹³	37.72 ¹⁴	19.7 ⁸	11.00 ²⁰	13.3 ²⁸	4.37 ⁹	73.4 ³⁰
36.0								
See δ, Tan δ	1.001	-0.030	1.011	-0.140	3.152	-2.080	1.281	+0.801
Mean Place	15° 53'	28 12	34° 50'	15 77	0° 39'	0° 66	3° 63'	74° 11
D ^h δ, D ^m δ	0.00	0.00	0.00	0.00	-0.08	+0.03	-0.02	-0.01
D ^h δ, D ^m δ	0.0	1.0	0.0	1.0	-0.1	-1.0	+0.1	-1.0

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	2 Aquilæ. Mag. 4.7		ϕ Sagittarii. Mag. 3.3		110 Herculis. Mag. 4.3		6 Aquilæ. Mag. 4.5	
	Right Ascension.	Declination S.	Right Ascension.	Declination S.	Right Ascension.	Declination N.	Right Ascension.	Declination S.
	h m 18 37	° ' " — 9 8	h m 18 40	° ' " — 27 4	h m 18 41	° ' " + 20 27	h m 18 42	° ' " — 4 50
n. 1.0	36.48	13.3	19.97	52.8	59.15	43.1	39.09	31.0
11.0	36.63 ¹⁵	14.0 ⁸	20.14 ¹⁷	52.5 ³	59.27 ¹²	40.7 ²⁴	39.23 ¹⁴	32.0 ¹⁰
20.9	36.82 ¹⁹	14.8 ⁷	20.35 ²¹	52.1 ⁴	59.43 ¹⁶	38.4 ²³	39.41 ¹⁸	33.0 ¹⁰
30.9	37.04 ²²	15.5 ⁷	20.60 ²⁵	51.8 ³	59.63 ²⁰	36.2 ²²	39.62 ²¹	33.9 ⁹
b. 9.9	37.29 ²⁵	16.1 ⁶	20.87 ²⁷	51.5 ³	59.86 ²³	34.3 ¹⁹	39.86 ²⁴	34.7 ⁸
	26	5	30	3	25	16	26	6
19.9	37.55	16.6	21.17	51.2	60.11	32.7	40.12	35.3
11.8	37.84 ²⁹	16.9 ³	21.48 ³¹	50.9 ³	60.38 ²⁷	31.4 ¹³	40.39 ²⁷	35.8 ⁵
11.8	38.13 ²⁹	17.0 ¹	21.81 ³³	50.5 ⁴	60.67 ²⁹	30.6 ⁸	40.68 ²⁹	36.0 ²
21.8	38.43 ³⁰	16.9 ¹	22.15 ³⁴	50.1 ⁴	60.97 ³⁰	30.3 ³	40.98 ³⁰	35.9 ¹
31.8	38.74 ³¹	16.6 ³	22.49 ³⁴	49.7 ⁴	61.28 ³¹	30.5 ²	41.28 ³⁰	35.6 ³
	31	6	34	4	30	6	31	6
r. 10.7	39.05	16.0	22.83	49.3	61.58	31.1	41.59	35.0
20.7	39.35 ³⁰	15.3 ⁷	23.17 ³⁴	48.8 ⁵	61.88 ³⁰	32.2 ¹¹	41.89 ³⁰	34.2 ⁸
30.7	39.65 ³⁰	14.4 ⁹	23.50 ³³	48.4 ⁴	62.18 ³⁰	33.7 ¹⁵	42.18 ²⁹	33.2 ¹⁰
ly 10.6	39.93 ²⁸	13.4 ¹⁰	23.82 ³²	48.0 ⁴	62.45 ²⁷	35.6 ¹⁹	42.46 ²⁸	32.0 ¹²
20.6	40.20 ²⁷	12.3 ¹¹	24.12 ³⁰	47.7 ³	62.71 ²⁶	37.7 ²¹	42.73 ²⁷	30.8 ¹²
	24	11	28	3	23	23	24	14
30.6	40.44	11.2	24.40	47.4	62.94	40.0	42.97	29.4
ne 9.6	40.66 ²²	10.1 ¹¹	24.64 ²⁴	47.2 ²	63.14 ²⁰	42.5 ²⁵	43.19 ²²	28.1 ¹³
19.5	40.84 ¹⁸	9.0 ¹¹	24.85 ²¹	47.2 ⁰	63.31 ¹⁷	45.0 ²⁵	43.37 ¹⁸	26.8 ¹³
29.5	40.99 ¹⁵	8.0 ¹⁰	25.02 ¹⁷	47.2 ⁰	63.44 ¹³	47.5 ²⁵	43.52 ¹⁵	25.5 ¹³
ly 9.5	41.10 ¹¹	7.1 ⁹	25.15 ¹³	47.3 ¹	63.52 ⁸	49.9 ²⁴	43.63 ¹¹	24.3 ¹²
	6	8	8	3	4	23	6	10
19.5	41.16	6.3	25.23	47.6	63.56	52.2	43.69	23.3
29.4	41.18 ²	5.7 ⁶	25.26 ³	47.9 ³	63.56 ⁰	54.3 ²¹	43.72 ³	22.4 ⁹
g. 8.4	41.16 ²	5.1 ⁶	25.24 ²	48.2 ³	63.51 ⁵	56.3 ²⁰	43.70 ²	21.6 ⁸
18.4	41.10 ⁶	4.7 ⁴	25.18 ⁶	48.6 ⁴	63.42 ⁹	57.9 ¹⁶	43.64 ⁶	20.9 ⁷
28.3	41.00 ¹⁰	4.3 ⁴	25.07 ¹¹	48.9 ³	63.30 ¹²	59.3 ¹⁴	43.54 ¹⁰	20.4 ⁵
	12	2	14	3	15	10	12	3
st. 7.3	40.88	4.1	24.93	49.2	63.15	60.3	43.42	20.1
17.3	40.73 ¹⁵	4.0 ¹	24.77 ¹⁶	49.5 ³	62.97 ¹⁸	61.0 ⁷	43.27 ¹⁵	19.9 ²
27.3	40.57 ¹⁶	3.9 ¹	24.60 ¹⁷	49.6 ¹	62.79 ¹⁸	61.4 ⁴	43.11 ¹⁶	19.8 ¹
t. 7.2	40.40 ¹⁷	4.0 ¹	24.41 ¹⁹	49.7 ¹	62.59 ¹⁹	61.4 ⁰	42.94 ¹⁷	19.8 ⁰
17.2	40.24 ¹⁶	4.1 ¹	24.24 ¹⁷	49.6 ¹	62.40 ²⁰	61.1 ³	42.78 ¹⁶	19.9 ¹
	14	2	16	1	17	6	14	3
27.2	40.10	4.3	24.08	49.5	62.23	60.5	42.64	20.2
v. 6.2	39.98 ¹²	4.6 ³	23.95 ¹³	49.2 ³	62.08 ¹⁵	59.5 ¹⁰	42.52 ¹²	20.6 ⁴
16.1	39.89 ⁹	4.9 ³	23.86 ⁹	48.9 ³	61.96 ¹²	58.1 ¹⁴	42.43 ⁹	21.2 ⁶
26.1	39.85 ⁴	5.4 ⁵	23.81 ⁵	48.5 ⁴	61.89 ⁷	56.5 ¹⁶	42.37 ⁶	21.8 ⁶
c. 6.1	39.84 ¹	6.0 ⁶	23.80 ¹	48.1 ⁴	61.85 ⁴	54.6 ¹⁹	42.36 ¹	22.6 ⁸
	5	6	5	4	0	21	4	9
16.0	39.89	6.6	23.85	47.7	61.85	52.5	42.40	23.5
26.0	39.97 ⁸	7.3 ⁷	23.95 ¹⁰	47.3 ⁴	61.90 ⁵	50.2 ²³	42.48 ⁸	24.4 ⁹
36.0	40.10 ¹³	8.1 ⁸	24.09 ¹⁴	46.9 ⁴	62.00 ¹⁰	47.8 ²⁴	42.60 ¹²	25.4 ¹⁰
Tan δ	1.013	-0.161	1.123	-0.511	1.067	+0.373	1.004	-0.085
Place	37°.244	5'".20	28°.767	44'".82	60°.160	50'".89	39°.865	22'".95
D _a	0.00	0.00	+0.01	+0.01	-0.01	0.00	0.00	0.00
D _a δ	+0.1	-1.0	+0.1	-1.0	+0.1	-1.0	+0.1	-1.0

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	λ Pavonis. Mag. 4.4		β Lyrae. Var. 3.4-4.1		50 Draconis. Mag. 5.4		γ Draconis. Mag. 4.8	
	Right Ascension.	Declination S.	Right Ascension.	Declination N.	Right Ascension.	Declination N.	Right Ascension.	Declination N.
	h m	° '	h m	° '	h m	° '	h m	° '
	18 44	-62 17	18 46	+33 15	18 48	+75 19	18 49	+59 16
	s	"	s	"	s	"	s	"
Jan. 1.0	18.92	18.4	55.20	40.8	61.31	56.7	54.28	56.9
11.0	19.19 ²⁷	16.0 ²⁴	55.31 ¹¹	37.9 ²⁹	61.30 ¹	53.2 ³⁵	54.34 ⁶	53.4 ⁵⁵
21.0	19.53 ³⁴	13.7 ²³	55.46 ¹⁵	35.0 ²⁹	61.46 ¹⁶	49.8 ³⁴	54.48 ¹⁴	50.0 ⁵⁴
30.9	19.94 ⁴¹	11.6 ²¹	55.65 ¹⁹	32.4 ²⁶	61.78 ³²	46.5 ³³	54.70 ²²	46.7 ³³
Feb. 9.9	20.41 ⁴⁷	9.6 ²⁰	55.88 ²³	30.0 ²⁴	62.25 ⁴⁷	43.5 ³⁰	54.99 ²⁹	43.8 ²⁹
	52	17	26	20	60	25	35	25
19.9	20.93	7.9	56.14	28.0	62.85	41.0	55.34	41.3
Mar. 1.8	21.48 ⁵⁵	6.5 ¹⁴	56.43 ²⁹	26.4 ¹⁶	63.56 ⁷¹	38.9 ²¹	55.73 ³⁹	39.2 ²¹
11.8	22.07 ⁵⁹	5.3 ¹²	56.74 ³¹	25.3 ¹¹	64.36 ⁸⁰	37.4 ¹⁵	56.17 ⁴⁴	37.8 ¹⁴
21.8	22.68 ⁶¹	4.5 ⁸	57.06 ³²	24.8 ⁵	65.22 ⁸⁶	36.5 ⁹	56.63 ⁴⁶	37.0 ⁸
31.8	23.30 ⁶²	3.9 ⁶	57.38 ³²	24.9 ¹	66.10 ⁸⁸	36.3 ²	57.11 ⁴⁸	36.9 ¹
	62	2	33	6	88	5	48	5
Apr. 10.7	23.92	3.7	57.71	25.5	66.98	36.8	57.59	37.4
20.7	24.53 ⁶¹	3.8 ¹	58.03 ³²	26.7 ¹²	67.83 ⁸⁵	37.9 ¹¹	58.05 ⁴⁶	38.6 ¹²
30.7	25.13 ⁶⁰	4.2 ⁴	58.34 ³¹	28.4 ¹⁷	68.62 ⁷⁹	39.5 ¹⁶	58.49 ⁴⁴	40.3 ¹⁷
May 10.7	25.69 ⁵⁶	4.9 ⁷	58.64 ³⁰	30.5 ²¹	69.33 ⁷¹	41.7 ²²	58.90 ⁴¹	42.6 ²³
20.6	26.21 ⁵²	5.9 ¹⁰	58.91 ²⁷	32.9 ²⁴	69.94 ⁶¹	44.4 ²⁷	59.26 ³⁶	45.3 ²⁷
	48	13	24	27	49	30	31	30
30.6	26.69	7.2	59.15	35.6	70.43	47.4	59.57	48.3
June 9.6	27.11 ⁴²	8.8 ¹⁶	59.36 ²¹	38.5 ²⁹	70.78 ³⁵	50.6 ³²	59.81 ²⁴	51.6 ³³
19.5	27.46 ³⁵	10.5 ¹⁷	59.52 ¹⁶	41.4 ²⁹	70.99 ²¹	54.1 ³⁵	59.99 ¹⁰	55.1 ³⁵
29.5	27.73 ²⁷	12.5 ²⁰	59.65 ¹³	44.4 ³⁰	71.06 ⁷	57.6 ³⁵	60.09 ¹⁰	58.6 ³⁵
July 9.5	27.92 ¹⁹	14.5 ²⁰	59.72 ⁷	47.4 ³⁰	70.98 ⁸	61.1 ³⁵	60.12 ³	62.1 ³⁵
	10	21	3	28	23	34	5	54
19.5	28.02	16.6	59.75	50.2	70.75	64.5	60.07	65.5
29.4	28.03 ¹	18.6 ²⁰	59.72 ³	52.8 ²⁶	70.37 ³⁸	67.7 ³²	59.95 ¹²	68.7 ³²
Aug. 8.4	27.96 ⁷	20.6 ²⁰	59.65 ⁷	55.2 ²⁴	69.87 ⁵⁰	70.7 ³⁰	59.75 ²⁰	71.6 ²⁹
18.4	27.80 ¹⁶	22.4 ¹⁸	59.54 ¹¹	57.3 ²¹	69.25 ⁶²	73.3 ²⁶	59.50 ²⁵	74.3 ²⁷
28.3	27.57 ²³	24.0 ¹⁶	59.39 ¹⁵	59.1 ¹⁸	68.52 ⁷³	75.6 ²³	59.18 ³²	76.5 ²²
	30	12	18	14	82	19	36	18
Sept. 7.3	27.27	25.2	59.21	60.5	67.70	77.5	58.82	78.3
17.3	26.93 ³⁴	26.1 ⁹	59.00 ²¹	61.5 ¹⁰	66.82 ⁸⁸	78.9 ¹⁴	58.42 ⁴⁰	79.7 ¹⁴
27.3	26.56 ³⁷	26.6 ⁵	58.78 ²²	62.0 ⁵	65.89 ⁹³	79.9 ¹⁰	58.00 ⁴²	80.5 ⁸
Oct. 7.2	26.18 ³⁸	26.7 ¹	58.55 ²³	62.2 ²	64.94 ⁹⁵	80.3 ⁴	57.57 ⁴³	80.9 ⁴
17.2	25.80 ³⁵	26.3 ⁴	58.32 ²¹	61.9 ³	63.98 ⁹⁶	80.1 ⁷	57.14 ⁴³	80.7 ²
		8	21	7	92		41	8
27.2	25.45	25.5	58.11	61.2	63.06	79.4	56.73	79.9
Nov. 6.2	25.15 ³⁰	24.3 ¹²	57.92 ¹⁹	60.0 ¹²	62.19 ⁸⁷	78.2 ¹²	56.34 ³⁹	78.6 ¹³
16.1	24.91 ²⁴	22.7 ¹⁶	57.77 ¹⁵	58.4 ¹⁶	61.39 ⁸⁰	76.5 ¹⁷	56.00 ³⁴	76.9 ¹⁷
26.1	24.75 ¹⁶	20.8 ¹⁹	57.65 ¹²	56.5 ¹⁹	60.70 ⁶⁹	74.3 ²²	55.72 ²⁸	74.6 ²³
Dec. 6.1	24.68 ⁷	18.6 ²²	57.58 ⁷	54.2 ²³	60.13 ⁵⁷	71.7 ²⁶	55.50 ²²	71.9 ²⁷
	2	23	2	25	43	30	14	30
16.0	24.70	16.3	57.56	51.7	59.70	68.7	55.36	68.9
26.0	24.81 ¹¹	13.9 ²⁴	57.58 ²	48.9 ²⁸	59.42 ²⁸	65.4 ³³	55.29 ⁷	65.7 ³²
36.0	25.01 ²⁰	11.4 ²⁵	57.66 ⁸	46.0 ²⁹	59.31 ¹¹	62.0 ³⁴	55.30 ¹	62.2 ³³
Sec δ , Tan δ	2.150	-1.904	1.196	+0.656	3.950	+3.821	1.958	+1.663
Mean Place	20°.655	10''.72	56°.489	47''.96	67°.425	62''.48	56°.054	63''.03
D' ψ α , D ω α	+0.05	+0.02	-0.02	-0.01	-0.10	-0.05	-0.04	-0.02
D' ψ δ , D ω δ	+0.1	-1.0	+0.1	-1.0	+0.1	-1.0	+0.1	-1.0

FOR THE UPPER TRANSIT AT WASHINGTON.

n Solar Date.	σ Sagittarii. Mag. 2.1		θ Serpentis <i>pr.</i> Mag. 4.5		ϵ Lyrae. Var. 4.0-4.7		γ Lyrae. Mag. 3.3	
	Right Ascension.	Declination S.	Right Ascension.	Declination N.	Right Ascension.	Declination N.	Right Ascension.	Declination N.
	h m 18 49	° ' " -26 24	h m 18 51	° ' " + 4 5	h m 18 52	° ' " +43 49	h m 18 55	° ' " +32 33
n. 1.0	58.89 ^s	20.3	58.79 ^s	24.0	43.28 ^s	54.5	44.53 ^s	73.5
11.0	59.05 ¹⁶	20.0 3	58.92 ¹³	22.5 15	43.37 ⁹	51.3 32	44.63 ¹⁰	70.7 28
21.0	59.25 ²⁰	19.7 3	59.08 ¹⁶	21.0 15	43.51 ¹⁴	48.1 32	44.78 ¹⁵	67.9 28
30.9	59.48 ²³	19.3 4	59.28 ²⁰	19.6 14	43.70 ¹⁹	45.1 30	44.96 ¹⁸	65.2 27
b. 9.9	59.74 ²⁶	19.0 3	59.50 ²²	18.4 12	43.94 ²⁴	42.4 27	45.18 ²²	62.8 24
19.9	60.03 ²⁹	18.6 4	59.75 ²⁵	17.4 10	44.21 ²⁷	40.1 23	45.43 ²⁵	60.8 20
ar. 1.8	60.34 ³¹	18.2 4	60.01 ²⁶	16.7 7	44.52 ³¹	38.3 18	45.71 ²⁸	59.2 16
11.8	60.66 ³²	17.8 4	60.29 ²⁸	16.3 4	44.85 ³³	37.0 13	46.01 ³⁰	58.1 11
21.8	60.99 ³³	17.4 4	60.58 ²⁹	16.3 0	45.21 ³⁶	36.4 6	46.33 ³²	57.6 5
31.8	61.33 ³⁴	16.9 5	60.88 ³⁰	16.6 3	45.57 ³⁶	36.3 6	46.65 ³²	57.6 6
pr. 10.7	61.67 ³⁴	16.4 5	61.18 ³⁰	17.2 6	45.93 ³⁶	36.9 6	46.98 ³³	58.2 6
20.7	62.01 ³⁴	15.8 6	61.48 ³⁰	18.1 9	46.29 ³⁶	38.0 11	47.30 ³²	59.3 11
30.7	62.35 ³⁴	15.3 5	61.77 ²⁹	19.3 12	46.64 ³⁵	39.7 17	47.61 ³¹	60.9 16
ay 10.7	62.67 ³²	14.8 5	62.05 ²⁸	20.8 15	46.96 ³²	41.9 22	47.91 ³⁰	62.9 20
20.6	62.97 ³⁰	14.4 4	62.31 ²⁶	22.4 16	47.26 ³⁰	44.5 26	48.19 ²⁸	65.3 24
30.6	63.26 ²⁹	14.0 4	62.56 ²⁵	24.1 17	47.52 ²⁶	47.4 29	48.44 ²⁵	68.0 27
me 9.6	63.51 ²⁵	13.8 2	62.77 ²¹	25.9 18	47.74 ²²	50.5 31	48.65 ²¹	70.8 28
19.5	63.73 ²²	13.6 2	62.96 ¹⁹	27.7 18	47.91 ¹⁷	53.8 33	48.83 ¹⁸	73.8 30
29.5	63.90 ¹⁷	13.6 0	63.11 ¹⁵	29.5 18	48.03 ¹²	57.1 33	48.96 ¹³	76.8 30
ly 9.5	64.04 ¹⁴	13.7 1	63.22 ¹¹	31.2 17	48.10 ⁷	60.3 32	49.04 ⁸	79.7 29
19.5	64.12 ⁸	13.8 1	63.28 ⁶	32.8 16	48.11 ¹	63.5 32	49.08 ⁴	82.6 29
29.4	64.16 ⁴	14.1 3	63.31 ³	34.2 14	48.07 ⁴	66.4 29	49.07 ¹	85.2 26
ig. 8.4	64.15 ¹	14.4 3	63.29 ²	35.4 12	47.97 ¹⁰	69.2 28	49.01 ⁶	87.6 24
18.4	64.10 ⁵	14.8 4	63.23 ⁶	36.5 11	47.82 ¹⁵	71.6 24	48.91 ¹⁰	89.8 22
28.4	64.00 ¹⁰	15.1 3	63.14 ⁹	37.3 8	47.64 ¹⁸	73.6 20	48.77 ¹⁴	91.6 18
pt. 7.3	63.87 ¹³	15.4 3	63.01 ¹³	37.3 7	47.64 ²³	73.6 17	48.77 ¹⁸	91.6 15
17.3	63.71 ¹⁶	15.7 3	62.86 ¹⁵	38.0 4	47.41 ²⁵	75.3 12	48.59 ²⁰	93.1 10
27.3	63.54 ¹⁷	15.9 2	62.70 ¹⁶	38.4 3	47.16 ²⁵	76.5 12	48.39 ²⁰	94.1 7
t. 7.2	63.36 ¹⁸	16.0 1	62.53 ¹⁷	38.7 0	46.88 ²⁸	77.2 7	48.17 ²²	94.8 7
17.2	63.18 ¹⁸	16.0 0	62.36 ¹⁷	38.7 2	46.60 ²⁸	77.5 3	47.95 ²²	95.0 2
27.2	63.02 ¹⁶	16.0 1	62.36 ¹⁵	38.5 4	46.32 ²⁶	77.3 7	47.72 ²¹	94.8 6
v. 6.2	63.02 ¹³	15.9 2	62.21 ¹³	38.1 6	46.06 ²⁴	76.6 12	47.51 ¹⁹	94.2 11
16.1	62.89 ¹³	15.7 2	62.08 ¹³	37.5 6	45.82 ²⁴	75.4 12	47.32 ¹⁹	93.1 11
26.1	62.79 ¹⁰	15.5 2	61.98 ¹⁰	36.7 8	45.61 ²¹	73.8 16	47.17 ¹⁵	91.6 15
c. 6.1	62.73 ⁶	15.1 4	61.92 ⁶	35.7 10	45.45 ¹⁰	71.7 25	47.05 ¹²	89.8 18
16.1	62.72 ¹	14.8 3	61.90 ²	35.7 12	45.45 ¹²	71.7 25	47.05 ⁸	87.6 22
26.0	62.72 ³	14.8 4	61.90 ²	34.5 13	45.33 ⁶	69.2 28	46.97 ³	87.6 25
36.0	62.75 ⁹	14.4 4	61.92 ⁶	33.2 14	45.27 ⁰	66.4 30	46.94 ²	85.1 27
	62.84 ¹³	14.0 4	61.98 ¹⁰	31.8 15	45.27 ⁵	63.4 32	46.96 ⁷	82.4 28
	62.97 ¹³	13.6 4	62.08 ¹⁰	30.3 15	45.32 ⁵	60.2 32	47.03 ⁷	79.6 28
Tan δ	1.116	-0.497	1.003	+0.071	1.386	+0.960	1.187	+0.639
Place	59°.674	12".19	59°.617	31".68	44°.936	60".89	45°.811	80".08
D_{α}	+0.01	+0.01	0.00	0.00	-0.02	-0.01	-0.02	-0.01
D_{δ}	+0.1	-1.0	+0.1	-1.0	+0.1	-1.0	+0.1	-1.0

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	ε Aquilæ. Mag. 4.2		ζ Sagittarii. Mag. 2.7		ζ Aquilæ. Mag. 3.0		λ Aquilæ. Mag. 3.6	
	Right Ascension.	Declination N.	Right Ascension.	Declination S.	Right Ascension.	Declination N.	Right Ascension.	Declination S.
	h m s 18 55	° ' " + 14 56	h m s 18 57	° ' " - 30 0	h m s 19 1	° ' " + 13 43	h m s 19 1	° ' " - 5 0
Jan. 1.0	44.92	60.0	11.45	18.5	29.26	63.7	43.52	46.5
11.0	45.03	57.9	11.61	17.9	29.37	61.7	43.65	47.4
21.0	45.18	55.9	11.80	17.3	29.52	59.7	43.81	48.3
30.9	45.37	54.0	12.04	16.7	29.70	57.9	44.00	49.2
Feb. 9.9	45.59	52.3	12.30	16.1	29.91	56.2	44.22	49.9
19.9	45.83	50.9	12.59	15.6	30.15	54.8	44.47	50.4
Mar. 1.8	46.09	49.8	12.90	15.0	30.41	53.8	44.73	50.8
11.8	46.37	49.1	13.23	14.4	30.68	53.1	45.01	50.9
21.8	46.66	48.8	13.57	13.8	30.97	52.9	45.30	50.8
31.8	46.96	49.0	13.92	13.2	31.27	53.1	45.60	50.4
Apr. 10.7	47.26	49.6	14.28	12.7	31.57	53.7	45.91	49.8
20.7	47.56	50.6	14.63	12.1	31.87	54.7	46.21	48.9
30.7	47.85	52.0	14.97	11.6	32.17	56.0	46.51	47.9
May 10.7	48.14	53.7	15.31	11.2	32.45	57.7	46.80	46.7
20.6	48.40	55.7	15.63	10.8	32.72	59.6	47.08	45.3
30.6	48.64	57.8	15.92	10.6	32.97	61.7	47.34	43.9
June 9.6	48.86	60.1	16.19	10.5	33.18	64.0	47.57	42.6
19.5	49.04	62.4	16.42	10.5	33.37	66.2	47.77	41.2
29.5	49.18	64.7	16.61	10.6	33.52	68.5	47.93	39.9
July 9.5	49.29	67.0	16.76	10.9	33.63	70.7	48.06	38.7
19.5	49.35	69.1	16.85	11.3	33.70	72.8	48.14	37.6
29.4	49.36	71.0	16.90	11.7	33.72	74.7	48.18	36.6
Aug. 8.4	49.34	72.8	16.90	12.2	33.70	76.4	48.18	35.8
18.4	49.27	74.3	16.85	12.7	33.64	77.9	48.13	35.1
28.4	49.16	75.6	16.75	13.2	33.54	79.2	48.05	34.6
Sept. 7.3	49.03	76.6	16.62	13.7	33.41	80.2	47.93	34.2
17.3	48.87	77.3	16.46	14.1	33.25	80.9	47.79	34.0
27.3	48.69	77.7	16.28	14.4	33.08	81.3	47.64	33.9
Oct. 7.2	48.51	77.8	16.09	14.5	32.90	81.4	47.47	33.9
17.2	48.33	77.6	15.91	14.5	32.73	81.2	47.31	34.1
27.2	48.17	77.1	15.74	14.4	32.56	80.8	47.16	34.3
Nov. 6.2	48.02	76.2	15.60	14.2	32.42	80.0	47.03	34.7
16.1	47.91	75.1	15.49	13.8	32.30	78.9	46.93	35.2
26.1	47.83	73.8	15.42	13.3	32.22	77.6	46.87	35.8
Dec. 6.1	47.79	72.2	15.40	12.8	32.18	76.1	46.84	36.6
16.1	47.79	70.3	15.43	12.2	32.18	74.4	46.86	37.4
26.0	47.84	68.4	15.51	11.6	32.22	72.5	46.92	38.3
36.0	47.92	66.3	15.63	11.0	32.30	70.5	47.02	39.2
Sec δ, Tan δ	1.035	+0.267	1.155	-0.577	1.029	+0.244	1.004	-0.088
Mean Place	45° 857	67° 23	12° 248	10° 14	30° 184	70° 69	44° 284	38° 72
D'ψa, Dαa	-0.01	0.00	+0.01	+0.01	-0.01	0.00	0.00	0.00
Dψδ, Dαδ	+0.1	-1.0	+0.1	-1.0	+0.1	-1.0	+0.1	-1.0

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	α Coronæ Australis. Mag. 4.1		ι Lyrae. Mag. 5.1		π Sagittarii. Mag. 3.0		ψ Sagittarii. Mag. 4.9	
	Right Ascension.	Declination S.	Right Ascension.	Declination N.	Right Ascension.	Declination S.	Right Ascension.	Declination S.
	h m 19 3	° ' " -38 2	h m 19 4	° ' " +35 57	h m 19 4	° ' " -21 9	h m 19 10	° ' " -25 24
Jan. 1.0	40.52	25.7	14.76	52.7	41.83	43.0	19.02	23.5
11.0	40.68 ¹⁶	24.6 ¹¹	14.85 ⁹	49.7 ³⁰	41.97 ¹⁴	42.9 ¹	19.16 ¹⁴	23.1 ⁴
21.0	40.89 ²¹	23.5 ¹¹	14.97 ¹²	46.8 ²⁹	42.15 ¹⁸	42.8 ¹	19.33 ¹⁷	22.7 ⁴
30.9	41.14 ²⁵	22.4 ¹⁰	15.15 ¹⁸	44.1 ²⁷	42.36 ²¹	42.7 ¹	19.54 ²¹	22.3 ⁴
Feb. 9.9	41.42 ²⁸	21.4 ¹⁰	15.36 ²¹	41.6 ²⁵	42.60 ²⁴	42.6 ¹	19.78 ²⁴	21.9 ⁴
	31	10	25	22	26	2	27	4
19.9	41.73	20.4	15.61	39.4	42.86	42.4	20.05	21.5
Mar. 1.9	42.06 ³³	19.5 ⁹	15.89 ²⁸	37.7 ¹⁷	43.14 ²⁸	42.1 ³	20.34 ²⁹	21.0 ⁵
11.8	42.42 ³⁶	18.6 ⁹	16.19 ³⁰	36.5 ¹²	43.45 ³¹	41.7 ⁴	20.65 ³¹	20.4 ⁶
21.8	42.79 ³⁷	17.8 ⁸	16.51 ³²	35.8 ⁷	43.76 ³¹	41.2 ⁵	20.98 ³³	19.8 ⁶
31.8	43.17 ³⁸	17.1 ⁷	16.84 ³³	35.7 ¹	44.08 ³²	40.6 ⁶	21.31 ³³	19.2 ⁶
	38	6	34	5	33	6	33	7
Apr. 10.7	43.55	16.5	17.18	36.2	44.41	40.0	21.64	18.5
20.7	43.93 ³⁸	16.0 ⁵	17.52 ³⁴	37.3 ¹¹	44.74 ³³	39.3 ⁷	21.98 ³⁴	17.8 ⁷
30.7	44.31 ³⁸	15.6 ⁴	17.84 ³²	38.9 ¹⁶	45.06 ³²	38.5 ⁸	22.32 ³⁴	17.0 ⁸
May 10.7	44.68 ³⁷	15.4 ²	18.15 ³¹	40.9 ²⁰	45.38 ³²	37.7 ⁸	22.65 ³³	16.4 ⁶
20.6	45.03 ³⁵	15.3 ¹	18.44 ²⁹	43.3 ²⁴	45.68 ³⁰	37.0 ⁷	22.96 ³¹	15.7 ⁷
	33	1	26	27	28	7	29	5
30.6	45.36	15.4	18.70	46.0	45.96	36.3	23.25	15.2
June 9.6	45.65 ²⁹	15.6 ²	18.92 ²²	49.0 ³⁰	46.22 ²⁶	35.7 ⁶	23.52 ²⁷	14.8 ⁴
19.6	45.91 ²⁶	16.1 ⁵	19.11 ¹⁹	52.0 ³⁰	46.44 ²²	35.2 ⁵	23.76 ²⁴	14.5 ³
29.5	46.12 ²¹	16.6 ⁵	19.25 ¹⁴	55.1 ³¹	46.62 ¹⁸	34.8 ⁴	23.95 ¹⁹	14.3 ²
July 9.5	46.28 ¹⁶	17.3 ⁷	19.34 ⁹	58.2 ³¹	46.77 ¹⁵	34.5 ³	24.11 ¹⁶	14.2 ¹
	11	8	4	30	9	2	10	1
19.5	46.39	18.1	19.38	61.2	46.86	34.3	24.21	14.3
29.4	46.45 ⁶	19.0 ⁹	19.37 ¹	64.0 ²⁸	46.92 ⁶	34.2 ¹	24.27 ⁶	14.5 ²
Aug. 8.4	46.45 ⁰	20.0 ¹⁰	19.32 ⁵	66.6 ²⁶	46.92 ⁰	34.3 ¹	24.28 ¹	14.7 ²
18.4	46.40 ⁵	20.9 ⁹	19.21 ¹¹	68.9 ²³	46.88 ⁴	34.4 ¹	24.24 ⁴	15.0 ³
28.4	46.30 ¹⁰	21.7 ⁸	19.06 ¹⁵	70.9 ²⁰	46.80 ⁸	34.6 ²	24.16 ⁸	15.4 ⁴
	15	8	18	16	12	2	11	4
Sept. 7.3	46.15	22.5	18.88	72.5	46.68	34.8	24.05	15.8
17.3	45.98 ¹⁷	23.1 ⁶	18.67 ²¹	73.7 ¹²	46.54 ¹⁴	35.0 ²	23.90 ¹⁵	16.1 ³
27.3	45.78 ²⁰	23.6 ⁵	18.44 ²³	74.5 ⁸	46.37 ¹⁷	35.1 ¹	23.73 ¹⁷	16.3 ²
Oct. 7.3	45.57 ²¹	23.8 ²	18.20 ²⁴	74.8 ³	46.20 ¹⁷	35.3 ²	23.56 ¹⁷	16.5 ²
17.2	45.37 ²⁰	23.8 ⁰	17.97 ²³	74.7 ¹	46.03 ¹⁷	35.4 ¹	23.38 ¹⁸	16.7 ²
	19	2	23	5	16	0	16	0
27.2	45.18	23.6	17.74	74.2	45.87	35.4	23.22	16.7
Nov. 6.2	45.01 ¹⁷	23.2 ⁴	17.54 ²⁰	73.2 ¹⁰	45.73 ¹⁴	35.5 ¹	23.07 ¹⁵	16.6 ¹
16.1	44.88 ¹³	22.6 ⁶	17.36 ¹⁸	71.7 ¹⁵	45.63 ¹⁰	35.4 ¹	22.96 ¹¹	16.5 ¹
26.1	44.80 ⁸	21.8 ⁸	17.22 ¹⁴	69.8 ¹⁹	45.57 ⁶	35.3 ⁰	22.89 ⁷	16.2 ³
Dec. 6.1	44.77 ³	20.8 ¹⁰	17.13 ⁹	67.6 ²²	45.54 ³	35.3 ⁰	22.86 ³	15.9 ³
	2	10	5	25	2	1	1	3
16.1	44.79	19.8	17.08	65.1	45.56	35.2	22.87	15.6
26.0	44.86 ⁷	18.7 ¹¹	17.09 ¹	62.4 ²⁷	45.63 ⁷	35.1 ¹	22.94 ⁷	15.3 ³
36.0	44.99 ¹³	17.6 ¹¹	17.14 ⁵	59.5 ²⁹	45.74 ¹¹	35.0 ¹	23.04 ¹⁰	14.9 ⁴
Sec δ , Tan δ	1.270	-0.782	1.235	+0.726	1.072	-0.387	1.107	-0.475
Mean Place	41° 39' 1	17° 11'	16° 137	58° 48'	42° 575	34° 72'	19° 768	15° 01'
$D\phi\alpha$, $D\omega\alpha$	+0.02	+0.01	-0.02	-0.01	+0.01	+0.01	+0.01	+0.01
$D\phi\delta$, $D\omega\delta$	+0.1	-1.0	+0.1	-1.0	+0.1	-1.0	+0.1	-1.0

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date,	δ Draconis. Mag. 3.2		d Sagittarii. Mag. 5.0		θ Lyre. Mag. 4.5		ω Aquilæ. Mag. 5.1	
	Right Ascension.	Declination N.	Right Ascension.	Declination S.	Right Ascension.	Declination N.	Right Ascension.	Declination N.
	h m 19 12	" ' +67 30	h m 19 12	" ' -19 6	h m 19 13	" ' +37 58	h m 19 13	" ' +11 26
	s 19 12	" +67 30	s 19 12	" -19 6	s 19 13	" +37 58	s 19 13	" +11 26
Jan. 1.0	28.49	39.7	39.01	26.6	23.58	49.5	48.71	22.2
11.0	28.47 ²	36.2 ³⁵	39.13 ¹²	26.6 ⁰	23.65 ⁷	46.6 ²⁹	48.81 ¹⁰	20.3 ¹⁹
21.0	28.56 ⁹	32.8 ³⁴	39.30 ¹⁷	26.6 ⁰	23.77 ¹²	43.6 ³⁰	48.95 ¹⁴	18.5 ¹⁸
30.9	28.76 ²⁰	29.4 ³¹	39.50 ²⁰	26.6 ⁰	23.93 ¹⁶	40.8 ²⁶	49.12 ¹⁷	16.8 ¹⁷
Feb. 9.9	29.05 ³⁹	26.3 ³¹	39.73 ²³	26.5 ¹	24.14 ²¹	38.2 ²⁸	49.32 ²⁰	15.3 ¹⁵
	29.05 ²⁹	26.3 ²⁷	39.73 ²⁵	26.5 ¹	24.14 ²¹	38.2 ²³	49.32 ²³	15.3 ¹³
19.9	29.44	23.6	39.98	26.4	24.38	35.9	49.55	14.0
Mar. 1.9	29.90 ⁴⁶	21.3 ²³	40.26 ²⁸	26.1 ³	24.66 ²⁸	34.1 ¹⁸	49.80 ²⁵	13.0 ¹⁰
11.8	30.43 ⁵³	19.6 ¹⁷	40.55 ²⁹	25.7 ⁴	24.96 ³⁰	32.8 ¹³	50.07 ²⁷	12.4 ⁶
21.8	31.00 ⁵⁷	18.5 ¹¹	40.86 ³¹	25.2 ⁵	25.28 ³²	32.1 ⁷	50.35 ²⁸	12.2 ²
31.8	31.60 ⁶⁰	18.0 ⁵	41.17 ³¹	24.6 ⁶	25.62 ³⁴	31.9 ²	50.65 ³⁰	12.4 ²
	31.60 ⁶²	18.0 ²	41.17 ³³	24.6 ⁷	25.62 ³⁴	31.9 ⁴	50.65 ³⁰	12.4 ⁶
Apr. 10.7	32.22	18.2	41.50	23.9	25.96	32.3	50.95	13.0
20.7	32.82 ⁶⁰	19.1 ⁹	41.82 ³²	23.1 ⁸	26.30 ³⁴	33.3 ¹⁰	51.25 ³⁰	14.0 ¹⁰
30.7	33.40 ⁵⁸	20.5 ¹⁴	42.15 ³³	22.3 ⁸	26.64 ³⁴	34.9 ¹⁶	51.55 ³⁰	15.3 ¹³
May 10.7	33.94 ⁵⁴	22.6 ²¹	42.46 ³¹	21.4 ⁹	26.96 ³²	36.8 ¹⁹	51.84 ²⁹	16.9 ¹⁶
20.6	34.42 ⁴⁸	25.1 ²⁵	42.76 ³⁰	20.6 ⁸	27.26 ³⁰	39.2 ²⁴	52.11 ²⁷	18.8 ¹⁹
	34.42 ⁴¹	25.1 ²⁹	42.76 ²⁸	20.6 ⁹	27.26 ²⁷	39.2 ²⁸	52.11 ²⁶	18.8 ²¹
30.6	34.83	28.0	43.04	19.7	27.53	42.0	52.37	20.9
June 9.6	35.16 ³³	31.2 ³²	43.30 ²⁶	19.0 ⁷	27.77 ²⁴	44.9 ²⁹	52.60 ²³	23.0 ²¹
19.6	35.40 ²⁴	34.7 ³⁵	43.52 ²²	18.3 ⁷	27.96 ¹⁹	48.0 ³¹	52.80 ²⁰	25.2 ²²
29.5	35.55 ¹⁵	38.2 ³⁵	43.71 ¹⁹	17.7 ⁶	28.11 ¹⁵	51.2 ³²	52.96 ¹⁶	27.4 ²²
July 9.5	35.60 ⁵	41.8 ³⁶	43.86 ¹⁵	17.3 ⁴	28.21 ¹⁰	54.4 ³²	53.08 ¹²	29.5 ²¹
	35.60 ⁵	41.8 ³⁶	43.86 ¹¹	17.3 ³	28.21 ⁴	54.4 ³¹	53.08 ⁸	29.5 ²⁰
19.5	35.55 ¹⁶	45.4	43.97	17.0	28.25	57.5	53.16	31.5
29.4	35.39 ²⁴	48.8 ³⁴	44.02 ⁵	16.8 ²	28.25 ⁰	60.4 ²⁹	53.20 ⁴	33.4 ¹⁹
Aug. 8.4	35.15 ³³	51.9 ³¹	44.03 ¹	16.7 ¹	28.20 ⁵	63.1 ²⁷	53.19 ¹	35.1 ¹⁷
18.4	34.82 ²⁴	54.8 ²⁹	44.00 ³	16.7 ⁰	28.10 ¹⁰	65.5 ²⁴	53.14 ⁵	36.5 ¹⁴
28.4	34.41 ⁴¹	57.4 ²⁶	43.93 ⁷	16.8 ¹	27.95 ¹⁵	67.6 ²¹	53.06 ⁸	37.7 ¹²
	34.41 ⁴⁸	57.4 ²²	43.93 ¹¹	16.8 ¹	27.95 ¹⁸	67.6 ¹⁸	53.06 ¹²	37.7 ¹⁰
Sept. 7.3	33.93	59.6	43.82	16.9	27.77	69.4	52.94	38.7
17.3	33.40 ⁵³	61.3 ¹⁷	43.68 ¹⁴	17.1 ²	27.56 ²¹	70.7 ¹³	52.79 ¹⁵	39.4 ⁷
27.3	32.83 ⁵⁷	62.6 ¹³	43.52 ¹⁶	17.3 ²	27.33 ²³	71.6 ⁹	52.63 ¹⁶	39.9 ⁵
Oct. 7.3	32.24 ⁵⁹	63.3 ⁷	43.35 ¹⁷	17.4 ¹	27.08 ²⁵	72.1 ⁵	52.45 ¹⁸	40.0 ¹
17.2	31.64 ⁶⁰	63.5 ²	43.18 ¹⁷	17.6 ²	26.83 ²⁵	72.1 ⁰	52.28 ¹⁷	39.9 ¹
	31.64 ⁵⁹	63.5 ⁴	43.18 ¹⁶	17.6 ¹	26.83 ²³	72.1 ⁵	52.28 ¹⁶	39.9 ⁴
27.2	31.05	63.1	43.02	17.7	26.60	71.6	52.12	39.5
Nov. 6.2	30.49 ⁵⁶	62.2 ⁹	42.89 ¹³	17.7 ⁰	26.38 ²²	70.7 ⁹	51.97 ¹⁵	38.8 ⁷
16.1	29.97 ⁵²	60.8 ¹⁴	42.78 ¹¹	17.8 ¹	26.19 ¹⁹	69.3 ¹⁴	51.85 ¹²	37.9 ⁹
26.1	29.52 ⁴⁵	58.8 ²⁰	42.71 ⁷	17.8 ⁰	26.04 ¹⁵	67.5 ¹⁸	51.77 ⁸	36.8 ¹¹
Dec. 6.1	29.15 ³⁷	56.4 ²⁴	42.68 ³	17.9 ¹	25.93 ¹¹	65.3 ²²	51.72 ⁵	35.4 ¹⁴
	29.15 ²⁹	56.4 ²⁸	42.68 ¹	17.9 ⁰	25.93 ⁶	65.3 ²⁵	51.72 ¹	35.4 ¹⁶
16.1	28.86	53.6	42.69	17.9	25.87	62.8	51.71	33.8
26.0	28.67 ¹⁹	50.5 ³¹	42.75 ⁶	17.9 ⁰	25.86 ¹	60.1 ²⁷	51.74 ³	32.1 ¹⁷
36.0	28.59 ⁸	47.1 ³⁴	42.85 ¹⁰	17.9 ⁰	25.89 ³	57.2 ²⁹	51.82 ⁸	30.3 ¹⁸
Sec δ , Tan δ	2.614	+2.415	1.058	-0.346	1.269	+0.781	1.020	+0.202
Mean Place	32 ^h .37 ^m 0	43 ^m .19 ^s	39 ^h .73 ^m 6	18 ^m .35 ^s	25 ^h .02 ^m 6	54 ^m .54 ^s	49 ^h .60 ^m 4	28 ^m .76 ^s
D ψ α , D ω α	-0.06	-0.05	+0.01	+0.01	-0.02	-0.02	-0.01	0.00
D ψ δ , D ω δ	+0.1	-1.0	+0.1	-1.0	+0.1	-0.9	+0.1	-0.9

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	κ Cygni. Mag. 4.0		τ Draconis. Mag. 4.6		δ Aquilæ. Mag. 3.4		β Cygni. Mag. 3.2	
	Right Ascension.	Declination N.	Right Ascension.	Declination N.	Right Ascension.	Declination N.	Right Ascension.	Declination N.
	h m	° '	h m	° '	h m	° '	h m	° '
	19 15	+53 12	19 17	+73 11	19 21	+ 2 56	19 27	+27 46
	s	"	s	"	s	"	s	"
Jan. 1.0	6.15	36.4	6.43	50.1	11.97	33.3	16.43	44.8
11.0	6.19 ⁴	33.1 ³³	6.35 ⁸	46.7 ³⁴	12.07 ¹⁰	31.9 ¹⁴	16.50 ⁷	42.3 ²⁵
21.0	6.29 ¹⁰	29.7 ³⁴	6.41 ⁶	43.3 ³⁴	12.21 ¹⁴	30.6 ¹³	16.61 ¹¹	39.7 ²⁶
30.9	6.46 ¹⁷	26.5 ³²	6.62 ²¹	39.9 ³⁴	12.38 ¹⁷	29.4 ¹²	16.76 ¹⁵	37.3 ²⁴
Feb. 9.9	6.69 ²³	23.6 ²⁹	6.96 ³⁴	36.8 ³¹	12.58 ²⁰	28.3 ¹¹	16.95 ¹⁹	35.0 ²³
	28	26	47	28	22	9	22	19
19.9	6.97	21.0	7.43	34.0	12.80	27.4	17.17	33.1
Mar. 1.9	7.30 ³³	18.8 ²²	8.00 ⁵⁷	31.7 ²³	13.05 ²⁵	26.8 ⁶	17.42 ²⁵	31.5 ¹⁶
11.8	7.66 ³⁶	17.2 ¹⁶	8.66 ⁶⁶	29.9 ¹⁸	13.32 ²⁷	26.4 ⁴	17.69 ²⁷	30.4 ¹¹
21.8	8.06 ⁴⁰	16.2 ¹⁰	9.39 ⁷³	28.7 ¹²	13.60 ²⁸	26.4 ⁰	17.98 ²⁹	29.8 ⁶
31.8	8.47 ⁴¹	15.9 ³	10.16 ⁷⁷	28.1 ⁶	13.89 ²⁹	26.8 ⁴	18.29 ³¹	29.7 ¹
	42	3	78	1	30	6	31	4
Apr. 10.8	8.89	16.2	10.94	28.2	14.19	27.4	18.60	30.1
20.7	9.31 ⁴²	17.1 ⁹	11.72 ⁷⁸	29.0 ⁸	14.49 ³⁰	28.4 ¹⁰	18.92 ³²	31.0 ⁹
30.7	9.72 ⁴¹	18.6 ¹⁵	12.46 ⁷⁴	30.3 ¹³	14.79 ³⁰	29.6 ¹²	19.24 ³²	32.4 ¹⁴
May 10.7	10.10 ³⁸	20.7 ²¹	13.15 ⁶⁹	32.3 ²⁰	15.08 ²⁹	31.1 ¹⁵	19.55 ³¹	34.2 ¹⁸
20.6	10.46 ³⁶	23.2 ²⁵	13.76 ⁶¹	34.7 ²⁴	15.37 ²⁹	32.7 ¹⁶	19.84 ²⁹	36.4 ²²
	31	29	51	28	26	17	27	25
30.6	10.77	26.1	14.27	37.5	15.63	34.4	20.11	38.9
June 9.6	11.03 ²⁶	29.3 ³²	14.68 ⁴¹	40.7 ³²	15.87 ²⁴	36.2 ¹⁸	20.35 ²⁴	41.6 ²⁷
19.6	11.24 ²¹	32.6 ³³	14.97 ²⁹	44.1 ³⁴	16.08 ²¹	38.1 ¹⁹	20.56 ²¹	44.4 ²⁸
29.5	11.39 ¹⁵	36.1 ³⁵	15.13 ¹⁶	47.6 ³⁵	16.25 ¹⁷	39.9 ¹⁸	20.73 ¹⁷	47.3 ²⁹
July 9.5	11.47 ⁸	39.6 ³⁵	15.17 ⁴	51.2 ³⁶	16.39 ¹⁴	41.6 ¹⁷	20.85 ¹²	50.1 ²⁸
	2	35	10	36	9	16	8	28
19.5	11.49	43.1	15.07	54.8	16.48	43.2	20.93	52.9
29.5	11.45 ⁴	46.4 ³³	14.85 ²²	58.2 ³⁴	16.53 ⁵	44.7 ¹⁵	20.96 ³	55.6 ²⁷
Aug. 8.4	11.34 ¹¹	49.4 ³⁰	14.50 ³⁵	61.4 ³²	16.54 ¹	45.9 ¹²	20.94 ²	58.0 ²⁴
18.4	11.17 ¹⁷	52.2 ²⁸	14.04 ⁴⁶	64.4 ³⁰	16.51 ³	47.0 ¹¹	20.88 ⁶	60.2 ²²
28.4	10.94 ²³	54.7 ²⁵	13.48 ⁵⁶	67.0 ²⁶	16.44 ⁷	47.9 ⁹	20.78 ¹⁰	62.1 ¹⁹
	27	20	65	23	11	7	14	16
Sept. 7.3	10.67	56.7	12.83	69.3	16.33	48.6	20.64	63.7
17.3	10.36 ³¹	58.3 ¹⁶	12.11 ⁷²	71.1 ¹⁸	16.20 ¹³	49.1 ⁵	20.47 ¹⁷	64.9 ¹²
27.3	10.03 ³³	59.5 ¹²	11.34 ⁷⁷	72.5 ¹⁴	16.04 ¹⁶	49.4 ³	20.28 ¹⁹	65.8 ⁹
Oct. 7.3	9.68 ³⁵	60.1 ⁶	10.53 ⁸¹	73.3 ⁸	15.88 ¹⁶	49.5 ¹	20.07 ²¹	66.2 ⁴
17.2	9.32 ³⁶	60.2 ¹	9.71 ⁸²	73.7 ⁴	15.71 ¹⁷	49.4 ¹	19.87 ²⁰	66.3 ¹
	34	4	81	3	15	3	20	4
27.2	8.98	59.8	8.90	73.4	15.56	49.1	19.67	65.9
Nov. 6.2	8.66 ³²	58.9 ⁹	8.13 ⁷⁷	72.6 ⁸	15.42 ¹⁴	48.6 ⁵	19.49 ¹⁸	65.2 ⁷
16.2	8.37 ²⁹	57.5 ¹⁴	7.41 ⁷²	71.3 ¹³	15.31 ¹¹	47.9 ⁷	19.33 ¹⁶	64.1 ¹¹
26.1	8.13 ²⁴	55.5 ²⁰	6.76 ⁶⁵	69.4 ¹⁹	15.23 ⁸	47.0 ⁹	19.21 ¹²	62.5 ¹⁶
Dec. 6.1	7.94 ¹⁹	53.2 ²³	6.21 ⁵⁵	67.1 ²³	15.19 ⁴	46.0 ¹⁰	19.12 ⁹	60.7 ¹⁸
	14	28	43	27	1	12	5	21
16.1	7.80	50.4	5.78	64.4	15.18	44.8	19.07	58.6
26.0	7.73 ⁷	47.4 ³⁰	5.47 ³¹	61.3 ³¹	15.22 ⁴	43.6 ¹²	19.07 ⁰	56.3 ²³
36.0	7.73 ⁰	44.1 ³³	5.30 ¹⁷	58.0 ³³	15.29 ⁷	42.3 ¹³	19.11 ⁴	53.8 ²⁵
Sec δ , Tan δ	1.670	+1.337	3.459	+3.312	1.001	+0.051	1.130	+0.527
Mean Place	8°.354	40''.35	11°.809	52''.90	12°.769	40''.13	17°.588	49''.51
D ϕ α , D ω α	-0.03	-0.03	-0.08	-0.07	0.00	0.00	-0.01	-0.01
D ϕ δ , D ω δ	+0.1	-0.9	+0.1	-0.9	+0.1	-0.9	+0.1	-0.9

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	γ Cygni. Mag. 3.9			μ Aquilæ. Mag. 4.6			h Sagittarii. Mag. 4.7			κ Aquilæ. Mag. 5.0		
	Right Ascension.		Declination N.	Right Ascension.		Declination N.	Right Ascension.		Declination S.	Right Ascension.		Declination S.
	h m	s	'	h m	s	'	h m	s	'	h m	s	'
	19 27		+ 51 32	19 29		+ 7 11	19 31		- 25 4	19 32		- 7 12
Jan. 1.0	31.72		50.8	55.42		45.8	31.45		28.4	18.46		69.2
11.0	31.74	2	47.6 32	55.51	9	44.2 16	31.56	11	28.0 4	18.56	10	69.9 7
21.0	31.83	9	44.3 33	55.64	13	42.7 15	31.71	15	27.6 4	18.69	13	70.6 7
31.0	31.98	15	41.1 32	55.80	16	41.3 14	31.90	19	27.1 5	18.86	17	71.2 6
Feb. 9.9	32.18	20	38.2 29	55.99	19	40.0 13	32.12	22	26.6 5	19.06	20	71.7 5
		26			21			25			22	
19.9	32.44		35.5	56.20		38.9	32.37		26.0	19.28		72.1
Mar. 1.9	32.75	31	33.3 22	56.44	24	38.1	32.64	27	25.4 6	19.52	24	72.3 2
11.8	33.09	34	31.7 16	56.70	26	37.6 5	32.94	30	24.7 7	19.79	27	72.2 1
21.8	33.46	37	30.6 11	56.98	28	37.5 1	33.25	31	24.0 7	20.07	28	71.9 3
31.8	33.86	40	30.1 5	57.26	28	37.7 2	33.57	32	23.1 9	20.37	30	71.4 5
		41			30			34			30	
Apr. 10.8	34.27		30.3	57.56		38.3	33.91		22.2	20.67		70.6
20.7	34.68	41	31.1 8	57.86	30	39.3 10	34.25	34	21.4 8	20.98	31	69.7 9
30.7	35.08	40	32.5 14	58.17	31	40.6 13	34.59	34	20.5 9	21.29	31	68.6 11
May 10.7	35.47	39	34.4 19	58.46	29	42.1 15	34.92	33	19.6 9	21.59	30	67.3 13
20.7	35.82	35	36.9 25	58.75	29	43.9 18	35.24	32	18.8 8	21.88	29	65.9 14
		32			27			31			28	
30.6	36.14		39.7	59.02		45.8	35.55		18.1	22.16		64.5
June 9.6	36.42	28	42.8 31	59.26	24	47.8 20	35.83	28	17.5 6	22.41	25	63.1 14
19.6	36.64	22	46.1 33	59.47	21	49.8 20	36.08	25	17.1 4	22.64	23	61.7 14
29.5	36.81	17	49.6 35	59.65	18	51.8 20	36.30	22	16.8 3	22.84	20	60.4 13
July 9.5	36.91	10	53.1 35	59.79	14	53.8 20	36.47	17	16.6 2	22.99	15	59.2 12
		5			10			13			11	
19.5	36.96		56.6	59.89		55.6	36.60		16.6	23.10		58.2
29.5	36.94	2	59.9 33	59.95	6	57.3 17	36.68	8	16.7 1	23.17	7	57.3 9
Aug. 8.4	36.85	9	63.0 31	59.96	1	58.9 16	36.71	3	17.0 3	23.20	3	56.5 8
18.4	36.71	14	65.9 20	59.93	3	60.2 13	36.69	2	17.3 3	23.18	2	55.9 6
28.4	36.51	20	68.4 25	59.86	7	61.3 11	36.63	6	17.7 4	23.12	6	55.4 5
		24			11			11			10	
Sept. 7.4	36.27		70.6	59.75		62.1	36.52		18.1	23.02		55.1
17.3	35.98	29	72.3 17	59.62	13	62.8 7	36.39	13	18.5 4	22.89	13	54.9 2
27.3	35.67	31	73.6 13	59.47	15	63.2 4	36.23	16	18.9 4	22.75	14	54.9 0
Oct. 7.3	35.35	32	74.4 8	59.31	16	63.3 1	36.06	17	19.2 3	22.59	16	54.9 0
17.2	35.01	34	74.7 3	59.14	17	63.3 0	35.88	18	19.4 2	22.43	16	55.1 2
		32			16			17			15	
27.2	34.69		74.4	58.98		63.0	35.71		19.5	22.28		55.3
Nov. 6.2	34.38	31	73.7 7	58.84	14	62.4 6	35.56	15	19.5 0	22.14	14	55.7 4
16.2	34.10	28	72.4 13	58.72	12	61.7 7	35.44	12	19.5 0	22.03	11	56.1 4
26.1	33.86	24	70.6 18	58.63	9	60.7 10	35.36	8	19.3 2	21.94	9	56.6 5
Dec. 6.1	33.66	20	68.4 22	58.57	6	59.5 12	35.31	5	19.0 3	21.90	4	57.1 5
		14			1			1			1	
16.1	33.52		65.8	58.56		58.2	35.30		18.7	21.89		57.7
26.1	33.44	8	62.8 30	58.58	2	56.8 14	35.34	4	18.4 3	21.92	3	58.4 7
36.0	33.43	1	59.7 31	58.64	6	55.2 16	35.43	9	18.0 4	22.00	8	59.2 8
Sec δ, Tan δ	1.608		+1.259	1.008		+0.126	1.104		-0.468	1.008		-0.127
Mean Place	33° 8' 00"		53° 7' 1"	56° 25' 1"		52° 05' 5"	32° 15' 53"		19° 74' 19"	19° 18' 0"		61° 8' 80"
D'ψ α, Dα α	-0.03		-0.03	0.00		0.00	+0.01		+0.01	0.00		0.00
D'ψ δ, Dα δ	+0.1		-0.9	+0.2		-0.9	+0.2		-0.9	+0.2		-0.9

(Eph 15)

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	θ Cygni. Mag. 4.6		ϵ Sagittarii. Mag. 5.4		β Sagittæ. Mag. 4.4		λ Cygni. Mag. 5.0	
	Right Ascension.	Declination N.	Right Ascension.	Declination S.	Right Ascension.	Declination N.	Right Ascension.	Declination N.
	h m	° '	h m	° '	h m	° '	h m	° '
	19 34	+50 1	19 35	-16 29	19 37	+17 16	19 41	+37 8
	s	"	s	"	s	"	s	"
Jan. 1.0	7.75	23.2	50.60	28.6	12.91	37.2	11.30	51.9
11.0	7.77 ²	20.0 ³²	50.70 ¹⁰	28.7 ¹	12.98 ⁷	35.1 ²¹	11.34 ⁴	49.1 ²⁸
21.0	7.85 ⁸	16.8 ³²	50.84 ¹⁴	28.8 ¹	13.09 ¹¹	33.1 ²⁰	11.43 ⁹	46.2 ²⁹
31.0	7.99 ¹⁴	13.6 ³²	51.02 ¹⁸	28.8 ⁰	13.23 ¹⁴	31.2 ¹⁹	11.56 ¹³	43.4 ²⁸
Feb. 9.9	8.18 ¹⁹	10.7 ²⁹	51.22 ²⁰	28.8 ⁰	13.41 ¹⁸	29.4 ¹⁸	11.73 ¹⁷	40.8 ²⁶
	25	27	23	2	21	16	21	23
19.9	8.43	8.0	51.45	28.6	13.62	27.8	11.94	38.5
Mar. 1.9	8.72 ²⁹	5.8 ²²	51.70 ²⁵	28.4 ²	13.85 ²³	26.6 ¹²	12.19 ²⁵	36.6 ¹⁹
11.8	9.05 ³³	4.1 ¹⁷	51.98 ²⁸	28.0 ⁴	14.11 ²⁶	25.8 ⁸	12.47 ²⁸	35.2 ¹⁴
21.8	9.41 ³⁶	3.0 ¹¹	52.27 ²⁹	27.4 ⁶	14.39 ²⁸	25.4 ⁴	12.78 ³¹	34.2 ¹⁰
31.8	9.79 ³⁸	2.5 ⁵	52.57 ³⁰	26.7 ⁷	14.68 ²⁹	25.4 ⁰	13.10 ³²	33.9 ³
	40	2	32	9	30	5	34	2
Apr. 10.8	10.19	2.7	52.89	25.8	14.98	25.9	13.44	34.1
20.7	10.59 ⁴⁰	3.4 ⁷	53.21 ³²	24.9 ⁹	15.28 ³⁰	26.9 ¹⁰	13.79 ³⁵	34.9 ⁸
30.7	10.99 ⁴⁰	4.8 ¹⁴	53.53 ³²	23.9 ¹⁰	15.59 ³¹	28.2 ¹³	14.13 ³⁴	36.2 ¹³
May 10.7	11.37 ³⁸	6.7 ¹⁹	53.85 ³²	22.8 ¹¹	15.89 ³⁰	29.9 ¹⁷	14.46 ³³	38.0 ¹⁸
20.7	11.72 ³⁵	9.0 ²³	54.16 ³¹	21.7 ¹¹	16.18 ²⁹	31.9 ²⁰	14.78 ³²	40.3 ²³
	32	28	29	11	27	22	29	26
30.6	12.04 ²⁸	11.8	54.45	20.6	16.45	34.1	15.07	42.9
June 9.6	12.32 ²⁸	14.9 ³¹	54.72 ²⁷	19.6 ¹⁰	16.70 ²⁵	36.4 ²³	15.33 ²⁶	45.8 ²⁹
19.6	12.55 ²³	18.2 ³³	54.96 ²⁴	18.7 ⁹	16.91 ²¹	38.9 ²⁵	15.56 ²³	48.8 ³⁰
29.5	12.73 ¹⁸	21.6 ³⁴	55.17 ²¹	17.9 ⁸	17.09 ¹⁸	41.4 ²⁵	15.74 ¹⁸	52.0 ³²
July 9.5	12.84 ¹¹	25.1 ³⁵	55.33 ¹⁶	17.2 ⁷	17.23 ¹⁴	43.9 ²⁵	15.87 ¹³	55.2 ³²
	6	34	12	5	10	23	8	31
19.5	12.90	28.5	55.45	16.7	17.33	46.2	15.95	58.3
29.5	12.89 ¹	31.9 ³⁴	55.53 ⁸	16.3 ⁴	17.38 ⁵	48.4 ²¹	15.99 ⁴	61.4 ³¹
Aug. 8.4	12.82 ⁷	35.0 ³¹	55.57 ⁴	16.0 ³	17.39 ¹	50.5 ²²	15.97 ²	64.2 ²⁸
18.4	12.70 ¹²	37.9 ²⁹	55.55 ²	15.9 ¹	17.36 ³	52.3 ¹⁸	15.90 ⁷	66.8 ²⁶
28.4	12.52 ¹⁸	40.5 ²⁶	55.49 ⁶	15.9 ⁰	17.28 ⁸	53.8 ¹⁵	15.78 ¹²	69.1 ²³
	23	22	9	1	11	13	15	20
Sept. 7.4	12.29	42.7	55.40	16.0	17.17	55.1	15.63	71.1
17.3	12.03 ²⁶	44.5 ¹⁸	55.28 ¹²	16.1 ¹	17.03 ¹⁴	56.1 ¹⁰	15.44 ¹⁹	72.7 ¹⁶
27.3	11.74 ²⁹	45.8 ¹³	55.13 ¹⁵	16.3 ²	16.86 ¹⁷	56.8 ⁷	15.22 ²²	73.8 ¹¹
Oct. 7.3	11.42 ³²	46.7 ⁹	54.97 ¹⁶	16.5 ²	16.69 ¹⁷	57.2 ⁴	14.99 ²³	74.6 ⁸
17.2	11.10 ³²	47.1 ⁴	54.80 ¹⁷	16.7 ²	16.51 ¹⁸	57.2 ⁰	14.75 ²⁴	74.9 ³
	31	2	16	2	17	2	23	2
27.2	10.79	46.9	54.64	16.9	16.34	57.0	14.52	74.7
Nov. 6.2	10.49 ³⁰	46.2 ⁷	54.50 ¹⁴	17.1 ²	16.18 ¹⁶	56.4 ⁶	14.30 ²²	74.1 ⁶
16.2	10.22 ²⁷	45.0 ¹²	54.38 ¹²	17.3 ²	16.04 ¹⁴	55.4 ¹⁰	14.11 ¹⁹	73.0 ¹¹
26.1	9.99 ²³	43.3 ¹⁷	54.30 ⁸	17.4 ¹	15.93 ¹¹	54.2 ¹²	13.94 ¹⁷	71.5 ¹⁵
Dec. 6.1	9.80 ¹⁹	41.2 ²¹	54.25 ⁵	17.6 ²	15.86 ⁷	52.8 ¹⁴	13.82 ¹²	69.6 ¹⁹
	13	25	1	1	4	17	9	23
16.1	9.67	38.7	54.24	17.7	15.82	51.1	13.73	67.3
26.1	9.58 ⁹	35.8 ²⁰	54.28 ⁴	17.9 ²	15.83 ¹	49.2 ¹⁹	13.69 ⁴	64.8 ²⁵
36.0	9.56 ²	32.7 ³¹	54.36 ⁸	18.0 ¹	15.87 ⁴	47.2 ²⁰	13.70 ¹	62.0 ²⁸
Sec δ , Tan δ	1.556	+1.193	1.043	-0.296	1.047	+0.311	1.255	+0.758
Mean Place	9 ^h .746	25 ^m .54	51 ^h .289	20 ^m .51	13 ^h .855	42 ^m .23	12 ^h .705	54 ^m .78
D ⁺ ϕ a, D _a a	-0.03	-0.03	+0.01	+0.01	-0.01	-0.01	-0.02	-0.02
D ⁺ ϕ δ , D _a δ	+0.2	-0.9	+0.2	-0.9	+0.2	-0.9	+0.2	-0.9

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	γ Sagittarii. Mag. 5.1		γ Aquilæ. Mag. 2.8		δ Cygni. Mag. 3.0		δ Sagittæ. Mag. 3.8	
	Right Ascension.	Declination S.	Right Ascension.	Declination N.	Right Ascension.	Declination N.	Right Ascension.	Declination N.
	h m 19 41	° ' " - 19 57	h m 19 42	° ' " + 10 24	h m 19 42	° ' " + 44 54	h m 19 43	° ' " + 18 19
Jan. 1.0	23.62 ¹⁰	66.9 ¹	12.27 ⁷	13.8 ¹⁷	17.43 ²	79.8 ³¹	34.91 ⁶	21.5 ²¹
11.0	23.72 ¹⁰	66.8 ¹	12.34 ⁷	12.1 ¹⁷	17.45 ²	76.7 ³¹	34.97 ⁶	19.4 ²¹
21.0	23.85 ¹³	66.7 ¹	12.45 ¹¹	10.4 ¹⁷	17.52 ⁷	73.6 ³¹	35.07 ¹⁰	17.4 ²⁰
31.0	24.02 ¹⁷	66.5 ²	12.59 ¹⁴	8.8 ¹⁶	17.65 ¹³	70.6 ³⁰	35.21 ¹⁴	15.4 ²⁰
Feb. 9.9	24.23 ²¹	66.2 ³	12.77 ¹⁸	7.4 ¹⁴	17.83 ¹⁸	67.8 ²⁸	35.38 ¹⁷	13.5 ¹⁹
	24.23 ²³	66.2 ⁴	12.77 ²⁰	7.4 ¹²	17.83 ²³	67.8 ²⁶	35.38 ²¹	13.5 ¹⁶
19.9	24.46 ²⁵	65.8 ⁴	12.97 ²³	6.2 ¹⁰	18.06 ²⁶	65.2 ²¹	35.59 ²³	11.9 ¹²
Mar. 1.9	24.71 ²⁸	65.4 ⁶	13.20 ²⁵	5.2 ⁶	18.32 ³⁰	63.1 ¹⁷	35.82 ²³	10.7 ⁹
11.9	24.99 ²⁸	64.8 ⁷	13.45 ²⁷	4.6 ²	18.62 ³⁰	61.4 ¹¹	36.07 ²⁵	9.8 ⁴
21.8	25.28 ³¹	64.1 ⁸	13.72 ²⁹	4.4 ²	18.95 ³⁶	60.3 ⁴	36.34 ²⁹	9.4 ⁶
31.8	25.59 ³²	63.3 ⁹	14.01 ³⁰	4.6 ⁶	19.31 ³⁶	59.9 ¹	36.63 ³⁰	9.4 ⁵
Apr. 10.8	25.91 ³²	62.4 ¹⁰	14.31 ³⁰	5.2 ⁹	19.67 ³⁸	60.0 ⁷	36.93 ³¹	9.9 ⁹
20.7	26.23 ³²	61.4 ¹⁰	14.61 ³⁰	6.1 ¹³	20.05 ³⁷	60.7 ¹³	37.24 ³¹	10.8 ¹³
30.7	26.56 ³³	60.4 ¹⁰	14.91 ³⁰	7.4 ¹⁶	20.42 ³⁶	62.0 ¹⁸	37.55 ³¹	12.1 ¹⁷
May 10.7	26.89 ³³	59.4 ¹⁰	15.21 ³⁰	9.0 ²⁰	20.78 ³⁶	63.8 ²³	37.85 ³⁰	13.8 ²⁰
20.7	27.20 ³⁰	58.4 ¹⁰	15.50 ²⁸	10.8 ²⁰	21.12 ³⁴	66.1 ²⁷	38.14 ²⁸	15.8 ²²
30.6	27.50 ²⁸	57.4 ⁹	15.78 ²⁵	12.8 ²²	21.43 ²⁸	68.8 ³⁰	38.42 ²⁵	8.0 ²⁴
June 9.6	27.78 ²⁵	56.5 ⁷	16.03 ²²	15.0 ²²	21.71 ²³	71.8 ³²	38.67 ²²	20.4 ²⁵
19.6	28.03 ²²	55.8 ⁷	16.25 ¹⁹	17.2 ²¹	21.94 ¹⁹	75.0 ³³	38.89 ¹⁹	22.9 ²⁵
29.6	28.25 ¹⁷	55.1 ⁷	16.44 ¹⁵	19.4 ²¹	22.13 ¹³	78.3 ³³	39.08 ¹⁴	25.4 ²⁵
July 9.5	28.42 ¹³	54.6 ³	16.59 ¹⁰	21.5 ²¹	22.26 ⁷	81.7 ³³	39.22 ¹¹	27.9 ²⁵
19.5	28.55 ⁹	54.3 ²	16.69 ⁷	23.6 ¹⁹	22.33 ²	85.0 ³³	39.33 ⁶	30.4 ²⁵
29.5	28.64 ⁴	54.1 ¹	16.76 ²	25.5 ¹⁷	22.35 ⁴	88.3 ³¹	39.39 ³	32.7 ²¹
Aug. 8.4	28.68 ¹	54.0 ¹	16.78 ²	27.2 ¹⁵	22.31 ⁹	91.4 ²⁸	39.40 ⁷	34.8 ¹⁸
18.4	28.67 ⁵	54.1 ¹	16.76 ⁷	28.7 ¹³	22.22 ¹⁴	94.2 ²⁵	39.37 ⁷	36.6 ¹⁷
28.4	28.62 ⁹	54.2 ²	16.69 ¹⁰	30.0 ¹¹	22.08 ¹⁹	96.7 ²²	39.30 ¹¹	38.3 ¹³
Sept. 7.4	28.53 ¹³	54.4 ³	16.59 ¹³	31.1 ⁸	21.89 ²³	98.9 ¹⁸	39.19 ¹⁴	39.6 ¹¹
17.3	28.40 ¹⁵	54.7 ³	16.46 ¹⁵	31.9 ⁵	21.66 ²⁵	100.7 ¹³	39.05 ¹⁶	40.7 ⁸
27.3	28.25 ¹⁶	55.0 ³	16.31 ¹⁶	32.4 ³	21.41 ²⁷	102.0 ⁹	38.89 ¹⁸	41.5 ⁴
Oct. 7.3	28.09 ¹⁷	55.3 ²	16.15 ¹⁷	32.7 ⁰	21.14 ²⁸	102.9 ⁴	38.71 ¹⁸	41.9 ¹
17.3	27.92 ¹⁶	55.5 ²	15.98 ¹⁷	32.7 ³	20.86 ²⁷	103.3 ¹	38.53 ¹⁸	42.0 ²
27.2	27.76 ¹⁵	55.7 ²	15.81 ¹⁵	32.4 ⁵	20.59 ²⁶	103.2 ⁶	38.35 ¹⁶	41.8 ⁶
Nov. 6.2	27.61 ¹²	55.9 ¹	15.66 ¹²	31.9 ⁸	20.33 ²⁴	102.6 ¹¹	38.19 ¹⁴	41.2 ⁹
16.2	27.49 ⁹	56.0 ⁰	15.54 ¹⁰	31.1 ¹⁰	20.09 ²⁰	101.5 ¹⁶	38.05 ¹¹	40.3 ¹²
26.1	27.40 ⁵	56.0 ⁰	15.44 ³	30.1 ¹⁴	19.89 ¹⁷	99.9 ²⁰	37.94 ⁸	39.1 ¹⁵
Dec. 6.1	27.35 ²	56.0 ⁰	15.37 ³	28.9 ¹⁴	19.72 ¹¹	97.9 ²⁴	37.86 ⁴	37.6 ¹⁶
16.1	27.33 ³	56.0 ¹	15.34 ¹	27.5 ¹⁶	19.61 ⁷	95.5 ²⁷	37.82 ⁰	36.0 ¹⁹
26.1	27.36 ⁸	55.9 ⁰	15.35 ⁵	25.9 ¹⁶	19.54 ¹	92.8 ²⁹	37.82 ⁰	34.1 ²¹
36.0	27.44 ⁸	55.9 ⁰	15.40 ⁵	24.3 ¹⁶	19.53 ¹	89.9 ²⁹	37.85 ³	32.0 ²¹
Sec δ , Tan δ	1.064	-0.363	1.017	+0.184	1.412	+0.997	1.053	+0.331
Mean Place	24°.292	58''.56	13°.113	19''.19	19°.145	81''.83	35°.865	26''.06
D γ α , D ω α	+0.01	+0.01	0.00	-0.01	-0.02	-0.03	-0.01	-0.01
D γ δ , D ω δ	+0.2	-0.9	+0.2	-0.9	+0.2	-0.9	+0.2	-0.9

FOR THE UPPER TRANSIT AT WASHINGTON.

Solar etc.	α Aquilæ. (Altair.) Mag. 0.9		η Aquilæ. Var. 3.7-4.4		ϵ Draconis. Mag. 4.0		ι Sagittarii. Mag. 4.2	
	Right Ascension.	Declina- tion N.	Right Ascension.	Declina- tion N.	Right Ascension.	Declina- tion N.	Right Ascension.	Declina- tion S.
	h m 19 46	° ' " + 8 38	h m 19 48	° ' " + 0 47	h m 19 48	° ' " + 70 2	h m 19 49	° ' " - 42 5
	s 19 46	" + 8 38	s 19 48	" + 0 47	s 19 48	" + 70 2	s 19 49	" - 42 5
l. 1.0	37.35	29.4	7.86	5.9	23.67	65.5	23.14	43.3
11.0	37.42 ⁷	27.8 ¹⁶	7.94 ⁸	4.8 ¹¹	23.54 ¹³	62.3 ³²	23.25 ¹¹	41.8 ¹⁵
21.0	37.53 ¹¹	26.3 ¹⁵	8.05 ¹¹	3.6 ¹²	23.53 ¹	58.9 ³⁴	23.40 ¹⁵	40.3 ¹⁵
31.0	37.67 ¹⁴	24.8 ¹⁵	8.20 ¹⁵	2.6 ¹⁰	23.64 ²³	55.5 ³⁴	23.60 ²⁰	38.8 ¹⁵
b. 9.9	37.85 ¹⁸	23.5 ¹³	8.37 ¹⁷	1.7 ⁹	23.87 ¹¹	52.3 ³²	23.84 ²⁴	37.2 ¹⁶
	20	11	20	7	33	30	27	16
19.9	38.05	22.4	8.57	1.0	24.20	49.3	24.11	35.6
ur. 1.9	38.27	21.5	8.80	0.5	24.64	46.7	24.42	34.1
11.9	38.52	21.0	9.05	0.3	25.16	44.6	24.76	32.7
21.8	38.79	20.9	9.32	0.4	25.75	43.1	25.12	31.3
31.8	39.08	21.1	9.60	0.8	26.39	42.2	25.50	30.1
	29	6	30	7	67	3	39	12
or. 10.8	39.37	21.7	9.90	1.5	27.06	41.9	25.89	28.9
20.7	39.67	22.6	10.20	2.4	27.74	42.3	26.29	27.9
30.7	39.98	23.9	10.51	3.7	28.41	43.4	26.70	27.1
ay 10.7	40.29	25.5	10.81	5.2	29.05	45.0	27.10	26.5
20.7	40.58	27.3	11.10	6.8	29.64	47.1	27.49	26.1
	27	20	28	17	52	26	38	2
30.6	40.85	29.3	11.38	8.5	30.16	49.7	27.87	25.9
ne 9.6	41.11	31.4	11.64	10.3	30.60	52.7	28.21	25.9
19.6	41.34	33.5	11.87	12.1	30.95	56.0	28.53	26.2
29.6	41.53	35.7	12.07	13.8	31.19	59.5	28.80	26.7
ly 9.5	41.69	37.7	12.24	15.5	31.33	63.2	29.02	27.5
	11	20	12	16	3	36	17	9
19.5	41.80	39.7	12.36	17.1	31.36	66.8	29.19	28.4
29.5	41.87	41.6	12.44	18.5	31.28	70.4	29.30	29.5
ig. 8.4	41.90	43.2	12.47	19.7	31.09	73.9	29.35	30.6
18.4	41.88	44.7	12.46	20.8	30.79	77.1	29.34	31.8
28.4	41.82	45.9	12.41	21.7	30.40	80.1	29.27	33.0
	9	10	9	6	47	26	11	12
pt. 7.4	41.73	46.9	12.32	22.3	29.93	82.7	29.16	34.2
17.3	41.60	47.7	12.20	22.8	29.39	85.0	29.00	35.2
27.3	41.46	48.2	12.06	23.1	28.79	86.7	28.81	36.0
t. 7.3	41.30	48.5	11.90	23.2	28.15	88.0	28.60	36.7
17.3	41.13	48.5	11.74	23.1	27.49	88.8	28.38	37.1
	16	2	15	3	67	2	22	1
27.2	40.97	48.3	11.59	22.8	26.82	89.0	28.16	37.2
v. 6.2	40.83	47.8	11.45	22.4	26.17	88.7	27.96	37.0
16.2	40.70	47.1	11.33	21.8	25.55	87.8	27.79	36.5
26.1	40.60	46.1	11.23	21.1	24.99	86.4	27.66	35.8
c. 6.1	40.53	45.0	11.17	20.3	24.50	84.4	27.57	34.9
	7	13	2	10	42	24	3	12
16.1	40.50	43.7	11.15	19.3	24.08	82.0	27.54	33.7
26.1	40.51	42.2	11.16	18.2	23.77	79.1	27.55	32.4
36.0	40.56	40.7	11.21	17.1	23.57	76.0	27.62	31.0
	5	15	5	11	20	31	7	14
tan δ	1.011	+0.152	1.000	+0.014	2.931	+2.755	1.348	-0.903
Place	38°.170	34°.84	8°.606	12°.13	28°.126	65°.07	23°.926	33°.21
D _{aa}	0.00	0.00	0.00	0.00	-0.07	-0.08	+0.02	+0.03
D _{aa} δ	+0.2	-0.9	+0.2	-0.9	+0.2	-0.9	+0.2	-0.9

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	ϵ Pavonis. Mag. 4.1		β Aquilæ. Mag. 3.9		γ Sagittæ. Mag. 3.7		ϵ Sagittarii. Mag. 4.6	
	Right Ascension.	Declination S.	Right Ascension.	Declination N.	Right Ascension.	Declination N.	Right Ascension.	Declination S.
	h m 19 50 s	° ' " -73 7 "	h m 19 51 s	° ' " + 6 11 "	h m 19 54 s	° ' " + 19 15 "	h m 19 57 s	° ' " -27 56 "
Jan. 1.0	44.30	81.4	7.49	31.8	57.64	34.3	25.37	58.5
11.0	44.43 ¹³	78.4 ³⁰	7.56 ⁷	30.4 ¹⁴	57.69 ⁵	32.2 ²¹	25.46 ⁹	57.9 ⁶
21.0	44.69 ²⁶	75.3 ³¹	7.67 ¹¹	28.9 ¹⁵	57.78 ⁹	30.1 ²¹	25.58 ¹²	57.2 ⁷
31.0	45.08 ³⁹	72.2 ³¹	7.81 ¹⁴	27.6 ¹³	57.91 ¹³	28.1 ²⁰	25.75 ¹⁷	56.4 ⁸
Feb. 9.9	45.58 ⁵⁰	69.3 ²⁹	7.97 ¹⁶	26.4 ¹²	58.07 ¹⁶	26.2 ¹⁹	25.95 ²⁰	55.6 ⁸
	61	28	20	10	19	16	23	9
19.9	46.19	66.5	8.17	25.4	58.26	24.6	26.18	54.7
Mar. 1.9	46.89 ⁷⁰	63.9 ²⁶	8.39 ²²	24.6 ⁸	58.48 ²²	23.3 ¹³	26.43 ²⁵	53.8 ⁹
11.9	47.67 ⁷⁸	61.6 ²³	8.64 ²⁵	24.2 ⁴	58.73 ²⁵	22.4 ⁹	26.71 ²⁸	52.8 ¹⁰
21.8	48.51 ⁸⁴	59.7 ¹⁹	8.91 ²⁷	24.1 ¹	58.99 ²⁶	21.9 ⁵	27.02 ³¹	51.7 ¹¹
31.8	49.40 ⁸⁹	58.1 ¹⁶	9.19 ²⁸	24.3 ²	59.28 ²⁹	21.8 ¹	27.34 ³²	50.6 ¹¹
	92	12	29	6	30	4	33	11
Apr. 10.8	50.32	56.9	9.48	24.9	59.58	22.2	27.67	49.5
20.7	51.25 ⁹³	56.1 ⁸	9.78 ³⁰	25.9 ¹⁰	59.89 ³¹	23.1 ⁹	28.02 ³⁵	48.4
30.7	52.19 ⁹⁴	55.7 ⁴	10.09 ³¹	27.2 ¹³	60.20 ³¹	24.4 ¹³	28.37 ³⁵	47.4
May 10.7	53.11 ⁹²	55.7 ⁰	10.39 ³⁰	28.7 ¹⁵	60.51 ³¹	26.1 ¹⁷	28.71 ³⁴	46.4
20.7	53.99 ⁸⁸	56.2 ⁵	10.69 ³⁰	30.4 ¹⁷	60.81 ³⁰	28.1 ²⁰	29.05 ³⁴	45.5
	83	9	28	19	28	22	33	8
30.6	54.82	57.1	10.97	32.3	61.09	30.3	29.38	44.7
June 9.6	55.57 ⁷⁵	58.4 ¹³	11.22 ²⁵	34.3 ²⁰	61.35 ²⁶	32.7 ²⁴	29.69 ³¹	44.1
19.6	56.23 ⁶⁶	60.0 ¹⁶	11.45 ²³	36.3 ²⁰	61.58 ²³	35.2 ²⁵	29.96 ²⁷	43.6
29.6	56.79 ⁵⁶	61.9 ¹⁹	11.65 ²⁰	38.3 ²⁰	61.78 ²⁰	37.8 ²⁶	30.20 ²⁴	43.3
July 9.5	57.23 ⁴⁴	64.1 ²²	11.81 ¹⁶	40.3 ²⁰	61.93 ¹⁵	40.4 ²⁶	30.41 ²¹	43.2
	31	24	12	18	11	25	15	1
19.5	57.54	66.5	11.93	42.1	62.04	42.9	30.56	43.3
29.5	57.71 ¹⁷	69.0 ²⁵	12.01 ⁸	43.8 ¹⁷	62.11 ⁷	45.3 ²⁴	30.67 ¹¹	43.5
Aug. 8.4	57.73 ²	71.5 ²⁵	12.04 ³	45.3 ¹⁵	62.14 ³	47.5 ²²	30.72 ⁵	43.9
18.4	57.62 ¹¹	74.0 ²⁵	12.03 ¹	46.7 ¹⁴	62.11 ³	49.5 ²⁰	30.73 ¹	44.4
28.4	57.37 ²⁵	76.3 ²³	11.98 ⁵	47.8 ¹¹	62.05 ⁶	51.2 ¹⁷	30.69 ⁴	44.9
	37	21	9	9	10	15	9	6
Sept. 7.4	57.00	78.4	11.89	48.7	61.95	52.7	30.60	45.5
17.3	56.52 ⁴⁸	80.1 ¹⁷	11.77 ¹²	49.3 ⁶	61.81 ¹⁴	53.8 ¹¹	30.48 ¹²	46.1
27.3	55.96 ⁵⁶	81.5 ¹⁴	11.62 ¹⁵	49.8 ⁵	61.66 ¹⁵	54.7 ⁹	30.33 ¹⁵	46.7
Oct. 7.3	55.34 ⁶²	82.4 ⁹	11.46 ¹⁶	50.0 ²	61.48 ¹⁸	55.2 ⁵	30.16 ¹⁷	47.2
17.3	54.69 ⁶⁵	82.7 ³	11.30 ¹⁶	50.0 ⁰	61.30 ¹⁸	55.4 ²	29.99 ¹⁷	47.5
	65	1	15	3	17	2	18	3
27.2	54.04	82.6	11.15	49.7	61.13	55.2	29.81	47.8
Nov. 6.2	53.43 ⁶¹	81.9 ⁷	11.00 ¹⁵	49.3 ⁴	60.96 ¹⁷	54.7 ⁵	29.65 ¹⁶	47.9
16.2	52.87 ⁵⁶	80.7 ¹²	10.87 ¹³	48.6 ⁷	60.82 ¹⁴	53.9 ⁸	29.51 ¹⁴	47.8
26.1	52.40 ⁴⁷	79.0 ¹⁷	10.77 ¹⁰	47.7 ⁹	60.70 ¹²	52.7 ¹²	29.41 ¹⁰	47.7
Dec. 6.1	52.04 ³⁶	76.8 ²²	10.71 ⁶	46.6 ¹¹	60.61 ⁹	51.3 ¹⁴	29.34 ⁷	47.4
	24	25	4	12	5	16	3	5
16.1	51.80	74.3	10.67	45.4	60.56	49.7	29.31	46.9
26.1	51.69 ¹¹	71.5 ²⁸	10.68 ¹	44.1 ¹³	60.55 ¹	47.8 ¹⁹	29.32 ¹	46.4
36.0	51.72 ³	68.5 ³⁰	10.72 ⁴	42.7 ¹⁴	60.57 ²	45.8 ²⁰	29.38 ⁶	45.8
Sec δ , Tan δ	3.447	-3.299	1.006	+0.108	1.059	+0.349	1.132	-0.531
Mean Place	46°.736	70°.08	8°.281	37°.35	58°.596	38°.11	26°.021	40°.34
D' ψ α , D ω α	+0.08	+0.10	0.00	0.00	-0.01	-0.01	+0.01	+0.02
D ψ δ , D ω δ	+0.2	-0.9	+0.2	-0.9	+0.2	-0.9	+0.2	-0.9

FOR THE UPPER TRANSIT AT WASHINGTON.

an Solar Date.	τ Aquilæ. Mag. 5.6		θ Aquilæ. Mag. 3.4		σ Cygni seq. Mag. 4.0		κ Cephei. Mag. 4.4	
	Right Ascension.	Declina- tion N.	Right Ascension.	Declina- tion S.	Right Ascension.	Declina- tion N.	Right Ascension.	Declina- tion N.
	h m 19 59	° ' " + 7 2	h m 20 6	° ' " - 1. 4	h m 20 10	° ' " + 46 28	h m 20 11	° ' " + 77 26
π . 1.1	58.50	10.2	54.49	33.5	55.60	59.7	39.16	84.8
11.0	58.55 5	8.7 15	54.55 6	34.5 10	55.58 2	56.7 30	38.79 37	81.7 31
21.0	58.65 10	7.3 14	54.64 9	35.4 9	55.62 4	53.7 30	38.61 18	78.4 33
31.0	58.78 13	5.9 12	54.77 13	36.3 9	55.71 9	50.7 30	38.61 0	75.1 33
β . 10.0	58.94 16	4.7 10	54.93 16	37.0 6	55.85 14	47.8 27	38.81 20	71.8 33
19.9	59.13 21	3.7 8	55.12 21	37.6 4	56.04 24	45.1 23	39.19 56	68.8 28
α . 1.9	59.34 24	2.9 5	55.33 24	38.0 1	56.28 28	42.8 23	39.75 70	66.0 24
11.9	59.58 26	2.4 1	55.57 26	38.1 2	56.56 31	40.9 19	40.45 83	63.6 18
21.8	59.84 28	2.3 3	55.83 27	37.9 5	56.87 35	39.5 7	41.28 93	61.8 13
31.8	60.12 30	2.6 6	56.10 30	37.4 8	57.22 37	38.8 2	42.21 99	60.5 6
ρ . 10.8	60.42 30	3.2 10	56.40 30	36.6 10	57.59 38	38.6 4	43.20 102	59.9 0
20.8	61.02 30	4.2 12	56.70 30	35.6 12	57.97 38	39.0 11	44.22 102	59.9 7
30.7	60.72 31	5.4 16	57.00 31	34.4 15	58.35 38	40.1 16	45.24 99	60.6 12
γ . 10.7	61.33 29	7.0 17	57.31 29	32.9 16	58.73 37	41.7 20	46.23 82	61.8 23
20.7	61.62 29	8.7 20	57.62 29	31.3 17	59.10 34	43.7 25	47.14 82	63.6 23
30.7	61.91 26	10.7 20	57.91 27	29.6 18	59.44 31	46.2 29	47.96 70	65.9 28
μ . 9.6	62.17 24	12.7 21	58.18 25	27.8 18	59.75 27	49.1 31	48.66 56	68.7 31
19.6	62.41 20	14.8 21	58.43 21	26.0 17	60.02 22	52.2 34	49.22 42	71.8 34
29.6	62.61 13	16.9 19	58.64 18	24.3 16	60.24 11	55.6 34	49.64 24	75.2 35
δ . 9.5	62.78 8	18.9 18	58.82 14	22.7 15	60.41 6	59.0 34	49.88 8	78.7 36
19.5	62.91 8	20.8 18	58.96 10	21.2 14	60.52 6	62.4 34	49.96 9	82.3 37
29.5	62.99 4	22.6 16	59.06 5	19.8 12	60.58 7	65.8 33	49.87 25	86.0 36
ζ . 8.5	63.03 0	24.2 14	59.11 1	18.6 10	60.58 7	69.1 30	49.62 42	89.6 34
18.4	63.03 5	25.6 12	59.12 4	17.6 8	60.51 11	72.1 28	49.20 56	93.0 32
28.4	62.98 8	26.8 10	59.08 7	16.8 6	60.40 17	74.9 25	48.64 71	96.2 29
η . 7.4	62.90 12	27.8 7	59.01 11	16.2 4	60.23 20	77.4 21	47.93 82	99.1 26
17.4	62.78 14	28.5 5	58.90 13	15.8 3	60.03 24	79.5 17	47.11 92	101.7 22
27.3	62.64 15	29.0 3	58.77 15	15.5 1	59.79 26	81.2 12	46.19 99	103.9 17
θ . 7.3	62.49 16	29.3 0	58.62 15	15.4 1	59.53 28	82.4 8	45.20 105	105.6 12
17.3	62.33 16	29.3 2	58.47 16	15.5 2	59.25 28	83.2 3	44.15 108	106.8 7
27.2	62.17 15	29.1 4	58.31 14	15.7 4	58.97 27	83.5 3	43.07 107	107.5 1
ν . 6.2	62.02 13	28.7 6	58.17 13	16.1 5	58.70 25	83.2 7	42.00 104	107.6 4
16.2	61.89 10	28.1 9	58.04 10	16.6 6	58.45 23	82.5 13	40.96 98	107.2 10
26.2	61.79 8	27.2 12	57.94 7	17.2 8	58.22 15	81.2 22	39.98 78	106.2 25
ξ . 6.1	61.71 4	26.2 12	57.87 4	18.0 8	58.03 19	79.5 22	39.08 48	104.7 21
16.1	61.67 0	25.0 14	57.83 0	18.8 10	57.88 11	77.3 25	38.30 63	102.6 25
26.1	61.67 4	23.6 14	57.83 4	19.8 9	57.77 5	74.8 28	37.67 48	100.1 29
36.1	61.71 4	22.2 14	57.87 4	20.7 9	57.72 5	72.0 28	37.19 48	97.2 29
δ , Tan δ n Place	1.008 59°.274	+0.123 15''.26	1.000 55°.179	-0.019 27''.58	1.452 57°.352	+1.053 59''.01	4.605 46°.465	+4.495 81''.33
α , D_{α} α β , D_{α} δ	0.00 +0.2	0.00 -0.9	0.00 +0.2	0.00 -0.9	-0.02 +0.2	-0.04 -0.8	-0.10 +0.2	-0.16 -0.8

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	24 Vulpeculæ. Mag. 5.4			α^2 Capricorni. Mag. 3.8			β Capricorni. Mag. 3.2			α Pavonis. Mag. 2.1		
	Right Ascension.	Declination N.		Right Ascension.	Declination S.		Right Ascension.	Declination S.		Right Ascension.	Declination S.	
	h m	° '		h m	° '		h m	° '		h m	° '	
	20 13	+24 24		20 13	-12 48		20 16	-15 2		20 18	-57 0	
	s	"		s	"		s	"		s	"	
Jan. 1.1	7.85	29.0		19.78	40.0		13.66	69.6		54.85	42.6	
11.0	7.88	26.8		19.84	40.3		13.72	69.7		54.91	40.3	
21.0	7.95	24.5		19.94	40.5		13.82	69.8		55.03	37.9	
31.0	8.05	22.3		20.07	40.6		13.95	69.8		55.22	35.4	
Feb. 10.0	8.19	20.2		20.23	40.6		14.11	69.7		55.47	32.9	
19.9	8.36	18.3		20.42	40.5		14.30	69.4		55.78	30.4	
Mar. 1.9	8.57	16.8		20.64	40.3		14.52	69.0		56.14	28.1	
11.9	8.81	15.6		20.88	39.8		14.76	68.5		56.54	25.8	
21.8	9.07	14.9		21.14	39.2		15.02	67.8		56.98	23.8	
31.8	9.35	14.6		21.43	38.4		15.31	66.9		57.45	22.0	
Apr. 10.8	9.65	14.9		21.73	37.4		15.61	65.8		57.95	20.4	
20.8	9.97	15.6		22.04	36.3		15.92	64.7		58.47	19.0	
30.7	10.29	16.8		22.36	35.0		16.24	63.4		59.00	18.0	
May 10.7	10.61	18.4		22.67	33.6		16.57	62.1		59.52	17.4	
20.7	10.92	20.4		22.99	32.3		16.89	60.7		60.04	17.0	
30.7	11.21	22.7		23.30	30.9		17.20	59.3		60.54	17.0	
June 9.6	11.49	25.2		23.58	29.5		17.49	58.1		61.01	17.4	
19.6	11.74	27.9		23.85	28.2		17.76	56.9		61.44	18.1	
29.6	11.95	30.7		24.08	27.1		17.99	55.8		61.82	19.1	
July 9.5	12.12	33.5		24.27	26.0		18.19	54.9		62.13	20.4	
19.5	12.25	36.2		24.43	25.2		18.35	54.2		62.38	22.0	
29.5	12.33	38.9		24.54	24.5		18.47	53.6		62.55	23.8	
Aug. 8.5	12.37	41.4		24.60	23.9		18.54	53.2		62.65	25.7	
18.4	12.36	43.7		24.62	23.6		18.56	53.0		62.66	27.6	
28.4	12.30	45.7		24.60	23.4		18.53	52.9		62.60	29.5	
Sept. 7.4	12.21	47.5		24.53	23.3		18.47	52.9		62.46	31.4	
17.4	12.08	48.9		24.43	23.4		18.37	53.0		62.27	33.0	
27.3	11.92	50.0		24.30	23.5		18.25	53.3		62.02	34.4	
Oct. 7.3	11.74	50.7		24.16	23.7		18.10	53.5		61.73	35.5	
17.3	11.56	51.1		24.00	23.9		17.94	53.8		61.42	36.3	
27.2	11.38	51.1		23.85	24.2		17.79	54.1		61.10	36.6	
Nov. 6.2	11.20	50.8		23.70	24.5		17.64	54.4		60.80	36.5	
16.2	11.04	50.1		23.57	24.9		17.51	54.7		60.52	36.0	
26.2	10.90	49.0		23.47	25.2		17.41	55.0		60.28	35.0	
Dec. 6.1	10.79	47.6		23.40	25.5		17.33	55.3		60.10	33.7	
16.1	10.72	45.8		23.36	25.8		17.29	55.5		59.97	32.0	
26.1	10.68	43.9		23.36	26.2		17.29	55.7		59.91	30.0	
36.1	10.68	41.7		23.40	26.5		17.33	55.8		59.92	27.8	
Sec δ , Tan δ	1.098	+0.454		1.026	-0.227		1.036	-0.269		1.837	-1.540	
Mean Place	8° 8' 74	31' 02		20° 38' 5	32' 60		14° 25' 3	61' 97		55° 8' 11	30' 54	
$D' \rho \alpha$, $D \omega \alpha$	-0.01	-0.02		+0.01	+0.01		+0.01	+0.01		+0.03	+0.06	
$D' \delta$, $D \omega \delta$	+0.2	-0.8		+0.2	-0.8		+0.2	-0.8		+0.2	-0.8	

FOR THE UPPER TRANSIT AT WASHINGTON.

n Solar date.	γ Cygni. Mag. 2.3		π Capricorni. Mag. 5.2		ρ Capricorni. Mag. 5.0		41 Cygni. Mag. 4.1	
	Right Ascension.	Declina- tion N.	Right Ascension.	Declina- tion S.	Right Ascension.	Declina- tion S.	Right Ascension.	Declina- tion N.
	h m 20 19	° ' " + 39 58	h m 20 22	° ' " - 18 29	h m 20 24	° ' " - 18 5	h m 20 25	° ' " + 30 4
a. I. 1	9.20	63.1	26.88	35.7	0.28	51.5	54.27	63.3
II. 0	9.19	60.4	26.93	35.6	0.33	51.5	54.28	61.0
21. 0	9.22	57.6	27.02	35.5	0.42	51.4	54.32	58.5
31. 0	9.31	54.8	27.15	35.2	0.55	51.1	54.41	56.1
b. 10. 0	9.44	52.1	27.31	34.8	0.71	50.8	54.53	53.7
19. 9	9.61	49.6	27.50	34.4	0.89	50.3	54.70	51.6
11. 9	9.83	47.4	27.71	33.8	1.11	49.7	54.90	49.8
21. 9	10.08	45.7	27.96	33.0	1.35	49.0	55.13	48.4
31. 8	10.37	44.5	28.22	32.2	1.61	48.1	55.39	47.4
10. 8	10.68	43.8	28.51	31.1	1.89	47.1	55.67	46.9
20. 8	11.02	43.7	28.81	30.0	2.20	46.0	55.98	47.0
30. 7	11.37	44.1	29.13	28.8	2.51	44.8	56.30	47.6
10. 7	11.73	45.1	29.45	27.5	2.84	43.5	56.63	48.7
20. 7	12.09	46.7	29.78	26.1	3.17	42.1	56.96	50.2
30. 7	12.43	48.7	30.11	24.8	3.49	40.8	57.29	52.2
19. 6	12.76	51.1	30.43	23.6	3.81	39.5	57.60	54.5
9. 6	13.06	53.9	30.73	22.4	4.11	38.3	57.89	57.1
19. 6	13.33	56.9	31.00	21.3	4.39	37.2	58.15	59.9
29. 6	13.55	60.1	31.25	20.4	4.63	36.2	58.37	62.8
ly 9. 6	13.73	63.4	31.46	19.7	4.84	35.5	58.56	65.8
19. 5	13.86	66.7	31.63	19.1	5.01	34.9	58.70	68.8
29. 5	13.93	69.9	31.75	18.7	5.14	34.5	58.79	71.7
ig. 8. 5	13.95	73.0	31.83	18.5	5.21	34.2	58.83	74.5
18. 4	13.92	75.9	31.86	18.5	5.25	34.1	58.83	77.1
28. 4	13.84	78.6	31.84	18.6	5.23	34.2	58.77	79.4
pt. 7. 4	13.71	80.9	31.78	18.8	5.17	34.4	58.68	81.5
17. 4	13.54	82.9	31.68	19.1	5.07	34.7	58.55	83.2
27. 3	13.34	84.5	31.56	19.4	4.95	35.0	58.39	84.6
t. 7. 3	13.12	85.7	31.41	19.8	4.81	35.4	58.21	85.6
17. 3	12.89	86.5	31.26	20.2	4.65	35.8	58.01	86.2
27. 3	12.65	86.7	31.10	20.5	4.49	36.1	57.81	86.4
iv. 6. 2	12.41	86.5	30.95	20.8	4.34	36.4	57.62	86.1
16. 2	12.20	85.8	30.81	21.0	4.21	36.7	57.44	85.5
26. 2	12.00	84.7	30.71	21.2	4.10	36.9	57.29	84.5
c. 6. 1	11.84	83.1	30.63	21.4	4.02	37.1	57.16	83.1
16. 1	11.71	81.1	30.58	21.5	3.97	37.2	57.06	81.3
26. 1	11.63	78.8	30.57	21.5	3.96	37.2	57.00	79.3
36. 1	11.59	76.2	30.60	21.4	3.99	37.2	56.98	77.0
l, Tan δ	1.305	+0.839	1.054	-0.334	1.052	-0.327	1.156	+0.579
Place	10°.642	62''59	27°.442	27''63	0°.841	43''55	55°.395	63''65
, D ₀ α	-0.02	-0.03	+0.01	+0.01	+0.01	+0.01	-0.01	-0.02
, D ₀ δ	+0.2	-0.8	+0.2	-0.8	+0.2	-0.8	+0.2	-0.8

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	θ Cephei. Mag. 4.3		ϵ Delphini. Mag. 4.0		Groombridge 3241. Mag. 6.4		α Indi. Mag. 3.2	
	Right Ascension.	Declination N.	Right Ascension.	Declination N.	Right Ascension.	Declination N.	Right Ascension.	Declination S.
	h m	° '	h m	° '	h m	° '	h m	° '
	20 28	+62 42	20 29	+11 0	20 30	+72 14	20 31	-47 35
	s	"	s	"	s	"	s	"
Jan. 1.1	6.48	33.2	8.38	45.9	18.09	42.7	34.83	31.7
	11.0	6.34 ¹⁴	8.41 ³	44.4 ¹⁵	17.82 ²⁷	39.7 ³⁰	34.87 ⁴	29.9 ¹⁸
	21.0	6.29 ⁵	8.47 ⁶	42.8 ¹⁶	17.66 ¹⁶	36.5 ³²	34.97 ¹⁰	27.9 ²⁰
	31.0	6.32 ³	8.57 ¹⁰	41.3 ¹⁵	17.64 ²	33.2 ³³	35.12 ¹⁵	25.9 ²⁰
Feb. 10.0	6.44 ¹²	20.5 ³²	8.70 ¹³	39.9 ¹⁴	17.76 ¹²	29.9 ³³	35.31 ¹⁹	23.8 ²¹
	20	31	16	12	24	32	24	21
Mar. 19.9	6.64	17.4	8.86	38.7	18.00	26.7	35.55	21.7
	1.9	6.92 ²⁸	9.05 ¹⁹	37.8 ⁹	18.37 ³⁷	23.9 ²⁸	35.83 ²⁸	19.6 ²¹
	11.9	7.27 ³⁵	9.27 ²²	37.2 ⁶	18.86 ⁴⁹	21.4 ²⁵	36.15 ³²	17.6 ²⁰
	21.9	7.68 ⁴¹	9.52 ²⁵	36.9 ³	19.44 ⁵⁸	19.4 ²⁰	36.50 ³⁵	15.6 ¹⁸
	31.8	8.14 ⁴⁶	9.78 ²⁶	37.0 ¹	20.09 ⁶⁵	18.0 ¹⁴	36.88 ³⁸	13.8 ¹⁷
	50	6	28	5	71	8	40	
Apr. 10.8	8.64	8.6	10.06	37.5	20.80	17.2	37.28	12.1
	20.8	9.17 ⁵³	10.36 ³⁰	38.4 ⁹	21.55 ⁷⁵	17.1 ¹	37.71 ⁴³	10.6 ¹⁵
	30.7	9.70 ⁵³	10.67 ³¹	39.6 ¹²	22.31 ⁷⁶	17.5 ⁴	38.14 ⁴³	9.4 ¹²
May 10.7	10.23 ⁵³	10.5 ¹²	10.98 ³¹	41.2 ¹⁶	23.05 ⁷⁴	18.6 ¹¹	38.58 ⁴⁴	8.4 ¹⁰
	20.7	10.73 ⁵⁰	11.28 ³⁰	43.0 ¹⁸	23.75 ⁷⁰	20.3 ¹⁷	39.02 ⁴⁴	7.6 ⁸
	47	24	30	20	65	22	42	4
June 30.7	11.20	14.7	11.58	45.0	24.40	22.5	39.44	7.2
	9.6	11.63 ⁴³	11.86 ²⁸	47.2 ²²	24.98 ⁵⁸	25.2 ²⁷	39.85 ⁴¹	7.1 ¹
	19.6	11.99 ³⁶	12.12 ²⁶	49.5 ²³	25.47 ⁴⁹	28.2 ³⁰	40.22 ³⁷	7.3 ²
	29.6	12.28 ²⁹	12.35 ²³	51.7 ²²	25.85 ³⁸	31.6 ³⁴	40.55 ³³	7.7 ⁴
July 9.6	12.50 ²²	27.5 ³⁵	12.54 ¹⁹	54.0 ²³	26.12 ²⁷	35.1 ³⁵	40.84 ²⁹	8.5 ¹⁰
	14	37	15	22	15	37	23	
Aug. 19.5	12.64	31.2	12.69	56.2	26.27	38.8	41.07	9.5
	29.5	12.70 ⁶	12.80 ¹¹	58.3 ²¹	26.30 ³	42.5 ³⁷	41.24 ¹⁷	10.8 ¹³
	8.5	12.67 ³	12.86 ⁶	60.2 ¹⁹	26.21 ⁹	46.2 ³⁷	41.34 ¹⁰	12.2 ¹⁴
	18.4	12.56 ¹¹	12.88 ²	61.9 ¹⁷	26.00 ²¹	49.7 ³⁵	41.38 ⁴	13.7 ¹⁵
	28.4	12.37 ¹⁹	12.86 ²	63.4 ¹⁵	25.68 ³²	53.0 ³³	41.36 ²	15.3 ¹⁶
	26	30	7	12	42	31	9	15
Sept. 7.4	12.11	48.2	12.79	64.6	25.26	56.1	41.27	16.8
	17.4	11.78 ³³	12.69 ¹⁰	65.6 ¹⁰	24.74 ⁵²	58.9 ²⁸	41.13 ¹⁴	18.3 ¹⁵
	27.3	11.41 ³⁷	12.57 ¹²	66.3 ⁷	24.14 ⁶⁰	61.3 ²⁴	40.95 ¹⁸	19.6 ¹³
Oct. 7.3	11.00 ⁴¹	54.7 ¹⁷	12.42 ¹⁵	66.8 ⁵	23.49 ⁶⁵	63.2 ¹⁹	40.74 ²¹	20.7 ¹¹
	17.3	10.55 ⁴⁵	12.27 ¹⁵	67.0 ²	22.79 ⁷⁰	64.7 ¹⁵	40.50 ²⁴	21.5 ⁸
	45	7	16	1	72	9	24	4
Nov. 27.3	10.10	56.7	12.11	66.9	22.07	65.6	40.26	21.9
	6.2	9.65 ⁴⁵	11.96 ¹⁵	66.6 ³	21.34 ⁷³	65.9 ³	40.03 ²³	22.1 ²
	16.2	9.21 ⁴⁴	11.82 ¹⁴	66.0 ⁶	20.62 ⁷²	65.7 ²	39.81 ²²	21.9 ⁶
	26.2	8.79 ⁴²	11.70 ¹²	65.2 ⁸	19.94 ⁶⁸	64.9 ⁸	39.63 ¹⁸	21.3 ⁹
Dec. 6.1	8.42 ³⁷	54.1 ¹⁵	11.61 ⁹	64.2 ¹⁰	19.32 ⁶²	63.5 ¹⁴	39.48 ¹⁵	20.4 ¹²
	31	20	7	12	55	19	10	
	16.1	8.11	11.54	63.0	18.77	61.6	39.38	19.2
	26.1	7.85 ²⁶	11.51 ³	61.6 ¹⁴	18.32 ⁴⁵	59.2 ²⁴	39.34 ⁴	17.7 ¹⁵
	36.1	7.67 ¹⁸	11.52 ¹	60.1 ¹⁵	17.97 ³⁵	56.5 ²⁷	39.35 ¹	16.0 ¹⁷
Sec δ , Tan δ	2.181	+1.938	1.019	+0.194	3.279	+3.123	1.484	-1.095
Mean Place	9 ^h .493	29 ^m .13	9 ^h .144	49 ^m .16	23 ^h .002	37 ^m .57	35 ^h .501	19 ^m .98
$D'\psi\alpha$, $D\omega\alpha$	-0.04	-0.08	0.00	-0.01	-0.07	-0.13	+0.02	+0.04
$D\psi\delta$, $D\omega\delta$	+0.2	-0.8	+0.2	-0.8	+0.2	-0.8	+0.2	-0.8

FOR THE UPPER TRANSIT AT WASHINGTON.

m Solar Date.	β Delphini. Mag. 3.7		ν Capricorni. Mag. 5.3		α Delphini. Mag. 3.9		β Pavonis. Mag. 3.6	
	Right Ascension.	Declination N.	Right Ascension.	Declination S.	Right Ascension.	Declination N.	Right Ascension.	Declination S.
	h m 20 33	° ' " + 14 17	h m 20 35	° ' " - 18 26	h m 20 35	° ' " + 15 36	h m 20 37	° ' " - 66 30
n. 1.1	33.03	53.2	12.24	26.5	40.61	40.3	17.54	48.6
11.1	33.05	51.5	12.29	26.4	40.62	38.5	17.54	45.8
21.0	33.11	49.8	12.37	26.3	40.67	36.8	17.63	42.9
31.0	33.20	48.1	12.48	26.0	40.76	35.0	17.81	40.0
b. 10.0	33.32	46.5	12.63	25.6	40.88	33.4	18.08	37.0
19.9	33.48	45.2	12.80	25.1	41.04	32.0	18.43	34.0
ar. 1.9	33.67	44.1	13.00	24.4	41.22	30.8	18.85	31.1
11.9	33.88	43.3	13.23	23.6	41.43	30.0	19.34	28.4
21.9	34.12	42.9	13.49	22.7	41.67	29.5	19.89	26.0
31.8	34.39	42.9	13.77	21.6	41.94	29.5	20.49	23.8
pr. 10.8	34.67	43.3	14.07	20.4	42.22	29.8	21.12	21.9
20.8	34.97	44.1	14.38	19.1	42.52	30.6	21.79	20.4
30.8	35.28	45.3	14.70	17.7	42.83	31.8	22.47	19.2
ay 10.7	35.59	46.8	15.03	16.3	43.14	33.3	23.16	18.4
20.7	35.90	48.7	15.36	14.9	43.46	35.2	23.85	18.0
30.7	36.20	50.8	15.68	13.6	43.76	37.3	24.51	18.1
me 9.6	36.48	53.0	15.99	12.3	44.04	39.6	25.13	18.6
19.6	36.74	55.4	16.28	11.2	44.30	42.0	25.70	19.5
29.6	36.97	57.8	16.53	10.2	44.53	44.5	26.21	20.7
ly 9.6	37.17	60.2	16.75	9.4	44.73	46.9	26.65	22.3
19.5	37.32	62.6	16.93	8.8	44.89	49.4	26.99	24.2
29.5	37.43	64.8	17.07	8.3	45.00	51.7	27.23	26.3
ig. 8.5	37.50	66.9	17.15	8.1	45.06	53.8	27.37	28.6
18.5	37.52	68.8	17.19	8.0	45.08	55.8	27.41	30.9
28.4	37.50	70.5	17.19	8.1	45.06	57.5	27.34	33.3
pt. 7.4	37.43	71.9	17.14	8.3	45.00	59.0	27.17	35.5
17.4	37.34	73.0	17.05	8.6	44.90	60.2	26.91	37.5
27.3	37.21	73.9	16.94	9.0	44.78	61.1	26.58	39.3
t. 7.3	37.06	74.5	16.80	9.4	44.63	61.8	26.18	40.7
17.3	36.90	74.8	16.64	9.9	44.47	62.1	25.75	41.6
27.3	36.74	74.8	16.49	10.3	44.31	62.1	25.29	42.1
iv. 6.2	36.59	74.5	16.34	10.6	44.15	61.9	24.84	42.1
16.2	36.44	73.9	16.20	10.9	44.00	61.3	24.42	41.6
26.2	36.32	73.1	16.09	11.1	43.88	60.5	24.04	40.5
ic. 6.2	36.22	72.0	16.00	11.3	43.78	59.4	23.72	39.0
16.1	36.15	70.7	15.95	11.4	43.70	58.0	23.48	37.1
26.1	36.12	69.2	15.93	11.4	43.66	56.5	23.32	34.8
36.1	36.11	67.6	15.94	11.3	43.66	54.8	23.26	32.3
5, Tan δ	1.032	+0.255	1.054	-0.333	1.038	+0.279	2.509	-2.301
a Place	33°.826	55°.61	12°.769	18°.57	41°.414	42°.38	18°.797	35°.31
ΔD_{α}	-0.01	-0.01	+0.01	+0.01	-0.01	-0.01	+0.05	+0.10
ΔD_{δ}	+0.2	-0.8	+0.2	-0.8	+0.2	-0.8	+0.3	-0.8

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	α Cygni. (Deneb.) Mag. 1.3		δ Delphini. Mag. 4.5		ψ Capricorni. Mag. 4.3		γ Delphini seq. Mag. 4.5	
	Right Ascension.	Declination N.	Right Ascension.	Declination N.	Right Ascension.	Declination S.	Right Ascension.	Declination N.
	h m 20 38	° ' " + 44 58	h m 20 39	° ' " + 14 45	h m 20 41	° ' " - 25 34	h m 20 42	° ' " + 15 48
Jan. 1.1	30.43	36.7	28.66	65.9	3.44	45.9	42.09	60.8
11.1	30.38 ⁵	34.0 ²⁷	28.67 ¹	64.2 ¹⁷	3.48 ⁴	45.3 ⁶	42.10 ¹	59.0 ¹⁸
21.0	30.38 ⁰	31.1 ²⁹	28.72 ⁵	62.5 ¹⁷	3.56 ⁸	44.7 ⁶	42.15 ⁵	57.3 ¹⁷
31.0	30.44 ⁶	28.2 ²⁹	28.81 ⁹	60.8 ¹⁷	3.67 ¹¹	44.0 ⁷	42.23 ⁸	55.5 ¹⁸
Feb. 10.0	30.54 ¹⁰	25.3 ²⁹	28.92 ¹¹	59.3 ¹⁵	3.82 ¹⁵	43.1 ⁹	42.34 ¹¹	53.9 ¹⁶
	16	26	15	14	17	9	15	14
19.9	30.70	22.7	29.07	57.9	3.99	42.2	42.49	52.5
Mar. 1.9	30.90 ²⁰	20.3 ²⁴	29.25 ¹⁸	56.8 ¹¹	4.20 ²¹	41.1 ¹¹	42.66 ¹⁷	51.3 ¹²
11.9	31.14 ²⁴	18.3 ²⁰	29.46 ²¹	56.0 ⁸	4.44 ²⁴	39.9 ¹²	42.87 ²¹	50.4 ⁹
21.9	31.43 ²⁹	16.8 ¹⁵	29.70 ²⁴	55.5 ⁵	4.70 ²⁶	38.7 ¹²	43.11 ²⁴	49.9 ⁵
31.8	31.75 ³²	15.9 ⁹	29.96 ²⁶	55.5 ⁰	4.99 ²⁹	37.3 ¹⁴	43.37 ²⁶	49.9 ⁰
	35	4	28	4	31	14	28	3
Apr. 10.8	32.10	15.5	30.24	55.9	5.30	35.9	43.65	50.2
20.8	32.47 ³⁷	15.7 ²	30.54 ³⁰	56.7 ⁸	5.62 ³²	34.5 ¹⁴	43.94 ²⁹	51.0 ⁸
30.8	32.85 ³⁸	16.5 ⁸	30.85 ³¹	57.8 ¹¹	5.96 ³⁴	33.1 ¹⁴	44.25 ³¹	52.1 ¹¹
May 10.7	33.23 ³⁸	17.8 ¹³	31.16 ³¹	59.4 ¹⁶	6.31 ³⁵	31.7 ¹⁴	44.57 ³²	53.6 ¹⁵
20.7	33.60 ³⁷	19.7 ¹⁹	31.47 ³¹	61.2 ¹⁸	6.65 ³⁴	30.4 ¹³	44.88 ³¹	55.4 ¹⁸
	36	23	30	21	34	12	30	21
30.7	33.96	22.0	31.77	63.3	6.99	29.2	45.18	57.5
June 9.6	34.29 ³³	24.7 ²⁷	32.06 ²⁹	65.6 ²³	7.31 ³²	28.2 ¹⁰	45.47 ²⁹	59.8 ²³
19.6	34.59 ³⁰	27.7 ³⁰	32.33 ²⁷	67.9 ²³	7.61 ³⁰	27.4 ⁸	45.74 ²⁷	62.2 ²⁴
29.6	34.84 ²⁵	30.9 ³²	32.56 ²³	70.4 ²⁵	7.88 ²⁷	26.7 ⁷	45.98 ²⁴	64.7 ²⁵
July 9.6	35.05 ²¹	34.3 ³⁴	32.76 ²⁰	72.8 ²⁴	8.12 ²⁴	26.3 ⁴	46.18 ²⁰	67.2 ²⁵
	15	34	16	24	19	2	16	24
19.5	35.20	37.7	32.92	75.2	8.31	26.1	46.34	69.6
Aug. 29.5	35.29 ⁹	41.1 ³⁴	33.04 ¹²	77.5 ²³	8.46 ¹⁵	26.1 ⁰	46.46 ¹²	71.9 ²³
8.5	35.33 ⁴	44.4 ³³	33.11 ⁷	79.6 ²¹	8.56 ¹⁰	26.2 ¹	46.53 ⁷	74. ²¹
18.5	35.31 ²	47.6 ³²	33.13 ²	81.5 ¹⁹	8.61 ⁵	26.5 ³	46.56 ³	76. ²⁰
28.4	35.24 ⁷	50.5 ²⁹	33.12 ¹	83.2 ¹⁷	8.61 ⁰	27.0 ⁵	46.54 ²	77.9 ¹⁸
	12	27	6	15	5	6	5	15
Sept. 7.4	35.12	53.2	33.06	84.7	8.56	27.6	46.49	79.4
17.4	34.95 ¹⁷	55.5 ²³	32.96 ¹⁰	85.9 ¹²	8.47 ⁹	28.3 ⁷	46.40 ⁹	80.6 ¹¹
27.3	34.74 ²¹	57.4 ¹⁹	32.84 ¹²	86.8 ⁹	8.35 ¹²	28.9 ⁶	46.27 ¹³	81.6 ¹⁰
Oct. 7.3	34.51 ²³	58.9 ¹⁵	32.70 ¹⁴	87.4 ⁶	8.21 ¹⁴	29.6 ⁷	46.13 ¹⁴	82.2 ⁶
17.3	34.26 ²⁵	60.0 ¹¹	32.54 ¹⁶	87.7 ³	8.05 ¹⁶	30.2 ⁶	45.97 ¹⁶	82.6 ⁴
	26	5	16	1	17	4	16	1
27.3	34.00	60.5	32.38	87.8	7.88	30.6	45.81	82.7
Nov. 6.2	33.75 ²⁵	60.6 ¹	32.22 ¹⁶	87.5 ³	7.72 ¹⁶	31.0 ⁴	45.65 ¹⁶	82.5 ²
16.2	33.50 ²⁵	60.2 ⁴	32.08 ¹⁴	87.0 ⁵	7.58 ¹⁴	31.2 ¹	45.51 ¹⁴	82.0 ⁵
26.2	33.27 ²³	59.2 ¹⁰	31.95 ¹³	86.2 ⁸	7.45 ¹³	31.3 ¹	45.38 ¹³	81.1 ⁹
Dec. 6.2	33.07 ²⁰	57.8 ¹⁴	31.85 ¹⁰	85.1 ¹¹	7.35 ¹⁰	31.2 ¹	45.27 ¹¹	80.1 ¹⁰
	16	19	8	13	6	2	7	13
16.1	32.91	55.9	31.77	83.8	7.29	31.0	45.20	78.8
26.1	32.79 ¹²	53.7 ²²	31.73 ⁴	82.3 ¹⁵	7.26 ³	30.7 ³	45.15 ⁵	77.3 ¹⁵
36.1	32.71 ⁸	51.1 ²⁶	31.73 ⁰	80.7 ¹⁶	7.28 ²	30.3 ⁴	45.14 ¹	75.6 ¹⁷
Sec δ , Tan δ	1.414	+0.999	1.034	+0.264	1.109	-0.479	1.039	+0.283
Mean Place	32°.029	33''.82	20°.443	67''.98	3°.938	36''.81	42°.881	62''.44
D ψ α , D ω α	-0.02	-0.04	-0.01	-0.01	+0.01	+0.02	-0.01	-0.01
D ψ δ , D ω δ	+0.3	-0.8	+0.3	-0.8	+0.3	-0.8	+0.3	-0.8

FOR THE UPPER TRANSIT AT WASHINGTON.

Solar lte.	ε Cygni. Mag. 2.6		ε Aquarii. Mag. 3.8		η Cephei. Mag. 3.6		μ Aquarii. Mag. 4.8	
	Right Ascension.	Declina- tion N.	Right Ascension.	Declina- tion S.	Right Ascension.	Declina- tion N.	Right Ascension.	Declina- tion S.
	h m 20 42	° ' " + 33 38	h m 20 43	° ' " - 9 48	h m 20 43	° ' " + 61 30	h m 20 48	° ' " - 9 17
	s	"	s	"	s	"	s	"
l. 1.1	45.14	66.2	4.02	33.7	30.98	35.6	3.71	77.2
11.1	45.12 ²	63.8 ²⁴	4.06 ⁴	34.1 ⁴	30.83 ¹⁵	32.8 ²⁸	3.74 ³	77.6 ⁴
21.0	45.15 ³	61.3 ²⁵	4.12 ⁶	34.4 ³	30.75 ⁸	29.7 ³¹	3.80 ⁶	77.9 ³
31.0	45.21 ⁶	58.7 ²⁶	4.22 ¹⁰	34.7 ³	30.76 ¹	26.5 ³²	3.89 ⁹	78.2 ³
b. 10.0	45.31 ¹⁰	56.3 ²⁴	4.35 ¹³	34.8 ¹	30.85 ⁹	23.3 ³²	4.02 ¹³	78.3 ¹
	15	23	16	0	16	31	15	c
19.9	45.46	54.0	4.51	34.8	31.01	20.2	4.17	78.3
ir. 1.9	45.65	52.0	4.70	34.6	31.26	17.4	4.35	78.1
11.9	45.87	50.5	4.91	34.2	31.57	15.0	4.56	77.7
21.9	46.12	49.3	5.15	33.5	31.95	13.1	4.80	77.1
31.8	46.41	48.7	5.41	32.7	32.39	11.8	5.06	76.3
	31	2	29	10	47	8	28	11
jr. 10.8	46.72	48.5	5.70	31.7	32.86	11.0	5.34	75.2
20.8	47.04	48.9	6.00	30.4	33.36	10.9	5.64	74.0
30.8	47.38	49.9	6.31	29.1	33.88	11.4	5.95	72.6
ay 10.7	47.73	51.3	6.62	27.6	34.40	12.5	6.27	71.1
20.7	48.06	53.2	6.94	26.0	34.90	14.2	6.59	69.5
	33	22	31	16	47	22	31	16
30.7	48.39	55.4	7.25	24.4	35.37	16.4	6.90	67.9
me 9.6	48.70	58.0	7.55	22.8	35.81	19.1	7.20	66.3
19.6	48.98	60.9	7.83	21.3	36.19	22.2	7.48	64.7
29.6	49.22	63.9	8.08	19.8	36.50	25.5	7.73	63.2
ily 9.6	49.42	67.0	8.30	18.5	36.75	29.0	7.95	61.9
	16	31	18	11	17	37	18	12
19.5	49.58	70.1	8.48	17.4	36.92	32.7	8.13	60.7
29.5	49.69	73.2	8.61	16.5	37.01	36.4	8.27	59.7
ig. 8.5	49.75	76.2	8.71	15.7	37.02	40.1	8.37	58.9
18.5	49.76	79.0	8.75	15.1	36.95	43.7	8.42	58.3
28.4	49.72	81.5	8.75	14.7	36.80	47.0	8.42	57.9
	8	23	4	2	22	31	4	3
pt. 7.4	49.64	83.8	8.71	14.5	36.58	50.1	8.38	57.6
17.4	49.51	85.8	8.63	14.4	36.30	52.9	8.31	57.5
27.3	49.36	87.4	8.52	14.5	35.97	55.3	8.21	57.6
it. 7.3	49.18	88.7	8.39	14.7	35.59	57.2	8.08	57.7
17.3	48.98	89.5	8.25	14.9	35.19	58.7	7.94	57.9
	20	4	15	3	42	10	15	4
27.3	48.78	89.9	8.10	15.2	34.77	59.7	7.79	58.3
iv. 6.2	48.58	89.9	7.95	15.6	34.34	60.1	7.64	58.7
16.2	48.38	89.4	7.82	16.0	33.92	59.9	7.51	59.1
26.2	48.21	88.5	7.71	16.4	33.53	59.2	7.40	59.5
x. 6.2	48.07	87.2	7.62	16.9	33.17	57.9	7.31	60.0
	12	16	6	4	32	18	6	4
16.1	47.95	85.6	7.56	17.3	32.85	56.1	7.25	60.4
26.1	47.87	83.6	7.54	17.8	32.59	53.8	7.22	60.9
36.1	47.82	81.3	7.55	18.2	32.40	51.2	7.22	61.3
	5	23	1	4	19	26	0	4
δ, Tan δ	1.202	+0.666	1.015	-0.173	2.096	+1.842	1.013	-0.164
n Place	46°.314	64°.68	4°.555	27°.29	33°.778	30°.14	4°.231	70°.94
1, D _u α	-0.01	-0.03	0.00	+0.01	-0.04	-0.08	0.00	+0.01
, D _u δ	+0.3	-0.8	+0.3	-0.8	+0.3	-0.8	+0.3	-0.7

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	β Indi. Mag. 3.7		32 Vulpeculæ. Mag. 5.2		290 Draconis (Heis). Mag. 5.6		γ Cygni. Mag. 4.0	
	Right Ascension	Declination S.	Right Ascension.	Declination N.	Right Ascension.	Declination N.	Right Ascension.	Declination N.
	h m 20 48	° ' " -58 46	h m 20 50	° ' " +27 43	h m 20 51	° ' " +80 13	h m 20 53	° ' " +40 50
Jan. 1.1	9.75 s	45 0 "	55.23 s	62 7 "	19.87 s	71.1 "	58.84 s	25.2 "
11.1	9.74 1	42.6 24	55.22 1	60.6 21	19.18 69	68.4 27	58.79 5	22.6 26
21.0	9.81 7	40.1 25	55.24 2	58.3 23	18.70 48	65.3 31	58.79 0	19.9 27
31.0	9.95 14	37.5 26	55.30 6	56.0 23	18 47 23	62.1 32	58.83 4	17.2 27
Feb. 10.0	10.15 20	34.7 28	55.40 10	53.8 22	18.48 1	58.9 32	58.92 9	14.5 27
	26	27	14	20	26	32	13	26
20.0	10.41	32.0 26	55.54 17	51.8 17	18.74 49	55.7 30	59.05 18	11.9 23
Mar. 1.9	10.73 32	29.4 26	55.71 21	50.1 17	19.23 71	52.7 27	59.23 22	9.6 19
11.9	11.10 37	26.8 24	55.92 23	48.7 10	19.94 91	50.0 23	59.45 26	7.7 14
21.9	11.52 46	24.4 23	56.15 27	47.7 5	20.85 106	47.7 17	59.71 29	6.3 10
31.8	11.98 49	22.1 20	56.42 29	47.2 0	21.91 118	46.0 12	60.00 33	5.3 4
Apr. 10.8	12.47 52	20.1 17	56.71 31	47.2 4	23.09 126	44.8 5	60.33 34	4.9 2
20.8	12.99 53	18.4 14	57.02 33	47.6 10	24.35 129	44.3 1	60.67 36	5.1 7
30.8	13.52 55	17.0 10	57.35 33	48.6 14	25.64 129	44.4 7	61.03 37	5.8 1
May 10.7	14.07 55	16.0 7	57.68 32	50.0 22	26.93 114	45.1 18	61.40 35	7.1 22
20.7	14.62 53	15.3 3	58.00 32	51.8 32	28.16 114	46.4 18	61.76 35	8.8 22
30.7	15.15 51	15.0 1	58.32 31	54.0 25	29.30 103	48.2 24	62.11 34	11.0 26
June 9.7	15.66 47	15.1 4	58.63 28	56.5 27	30.33 87	50.6 27	62.45 30	13.6 29
19.6	16.13 43	15.5 9	58.91 24	59.2 29	31.20 70	53.3 32	62.75 26	16.5 31
29.6	16.56 37	16.4 12	59.15 17	62.1 29	31.90 50	56.5 34	63.01 17	19.6 33
July 9.6	16.93 30	17.6 14	59.36 17	65.0 29	32.40 31	59.9 35	63.23 17	22.9 33
19.5	17.23 22	19.0 18	59.53 12	67.9 27	32.71 9	63.4 37	63.40 12	26.2 33
29.5	17.45 15	20.8 19	59.65 7	70.8 29	32.80 12	67.1 37	63.52 7	29.5 32
Aug. 8.5	17.60 6	22.7 20	59.72 3	73.5 26	32.68 33	70.8 36	63.59 1	32.7 31
18.5	17.66 2	24.7 21	59.75 2	76.1 23	32.35 53	74.4 36	63.60 4	35.8 29
28.4	17.64 10	26.8 21	59.73 7	78.4 21	31.82 71	78.0 33	63.56 10	38.7 26
Sept. 7.4	17.54 17	28.9 19	59.66 10	80.5 18	31.11 88	81.3 30	63.46 13	41.3 23
17.4	17.37 24	30.8 17	59.56 14	82.3 15	30.23 103	84.3 27	63.33 17	43.6 20
27.4	17.13 28	32.5 14	59.42 16	83.8 11	29.20 115	87.0 23	63.16 20	45.6 15
Oct. 7.3	16.85 31	33.9 10	59.26 17	84.9 7	28.05 126	89.3 19	62.96 22	47.1 11
17.3	16.54 33	34.9 7	59.09 18	85.6 4	26.79 132	91.2 13	62.74 23	48.2 6
27.3	16.21 33	35.6 2	58.91 19	86.0 1	25.47 135	92.5 8	62.51 23	48.8 3
Nov. 6.2	15.88 32	35.8 3	58.72 17	85.9 4	24.12 136	93.3 3	62.28 22	49.0 8
16.2	15.56 28	35.5 7	58.55 13	85.5 8	22.76 132	93.6 4	62.06 20	48.7 12
26.2	15.28 23	34.8 11	58.39 10	84.7 15	21.44 125	93.2 15	61.86 15	47.9 16
Dec. 6.2	15.05 18	33.7 15	58.26 10	83.5 18	20.19 113	92.3 25	61.67 15	46.7 24
16.1	14.87 11	32.2 19	58.16 7	82.0 18	19.06 100	90.8 20	61.52 11	45.1 21
26.1	14.76 5	30.3 22	58.09 4	80.2 20	18.06 81	88.8 25	61.41 8	43.0 24
36.1	14.71	28.1	58.05	78.2	17.25	86.3	61.33	40.6
Sec δ , Tan δ	1.929	-1.650	1.130	+0.526	5.896	+5.811	1.322	+0.864
Mean Place	10°.556	31''.82	56°.225	61''.69	28°.984	63''.12	60°.218	21''.60
$D'\psi a$, $D_w a$	+0.03	+0.07	-0.01	-0.02	-0.11	-0.26	-0.02	-0.04
$D\psi \delta$, $D_w \delta$	+0.3	-0.7	+0.3	-0.7	+0.3	-0.7	+0.3	-0.7

FOR THE UPPER TRANSIT AT WASHINGTON.

an Solar Date.	α Octantis. Mag. 5.2		γ Microscopii. Mag. 4.7		θ Capricorni. Mag. 4.2		ξ Cygni. Mag. 3.9	
	Right Ascension.	Declina- tion S.	Right Ascension.	Declina- tion S.	Right Ascension.	Declina- tion S.	Right Ascension.	Declina- tion N.
	h m 20 54	° ' " -77 20	h m 20 56	° ' " -32 35	h m 21 1	° ' " -17 34	h m 21 1	° ' " +43 35
n. 1.1	25.36	72.6	4.45	36.6	9.82	24.5	48.86	22.7
11.1	25.19 ¹⁷	69.5 ³¹	4.47 ²	35.7 ⁹	9.84 ²	24.4 ¹	48.79 ⁷	20.2 ²⁵
21.0	25.20 ¹	66.2 ³³	4.53 ⁶	34.6 ¹¹	9.89 ⁵	24.2 ²	48.77 ²	17.5 ²⁷
31.0	25.37 ¹⁷	62.8 ³⁴	4.63 ¹⁰	33.4 ¹²	9.97 ⁸	23.9 ³	48.79 ²	14.7 ²⁸
b. 10.0	25.71 ³⁴	59.4 ³⁴	4.76 ¹³	32.1 ¹³	10.09 ¹²	23.5 ⁴	48.87 ⁸	11.9 ²⁸
	50 ³⁴		17 ³⁴	14 ¹⁴	15 ¹⁵	5 ⁵	12 ¹²	26 ²⁶
20.0	26.21	56.0	4.93	30.7	10.24	23.0	48.99	9.3
ar. 1.9	26.85 ⁶⁴	52.7 ³³	5.14 ²¹	29.1 ¹⁶	10.41 ¹⁷	22.3 ⁷	49.16 ¹⁷	6.9 ²⁴
11.9	27.62 ⁷⁷	49.6 ³¹	5.37 ²³	27.5 ¹⁶	10.62 ²¹	21.4 ⁹	49.38 ²²	4.8 ²¹
21.9	28.50 ⁸⁸	46.8 ²⁸	5.64 ²⁷	25.9 ¹⁶	10.85 ²³	20.4 ¹⁰	49.64 ²⁶	3.2 ¹⁶
31.8	29.48 ⁹⁸	44.3 ²⁵	5.94 ³⁰	24.2 ¹⁷	11.11 ²⁶	19.2 ¹²	49.94 ³⁰	2.1 ¹¹
	106 ¹⁰⁶	21 ²¹	31 ³¹	16 ¹⁶	29 ²⁹	13 ¹³	33 ³³	5 ⁵
pr. 10.8	30.54	42.2	6.25	22.6	11.40	17.9	50.27	1.6
20.8	31.66 ¹¹²	40.4 ¹⁸	6.59 ³⁴	21.0 ¹⁶	11.70 ³⁰	16.5 ¹⁴	50.63 ³⁶	1.6 ⁰
30.8	32.82 ¹¹⁶	39.1 ¹³	6.95 ³⁶	19.4 ¹⁶	12.02 ³²	14.9 ¹⁶	51.00 ³⁷	2.2 ⁶
ay 10.7	33.99 ¹¹⁷	38.3 ⁸	7.31 ³⁶	18.0 ¹⁴	12.34 ³²	13.4 ¹⁵	51.37 ³⁷	3.4 ¹²
20.7	35.16 ¹¹⁷	37.9 ⁴	7.68 ³⁷	16.7 ¹³	12.67 ³³	11.8 ¹⁶	51.75 ³⁸	5.1 ¹⁷
	114 ¹¹⁴	1 ¹	36 ³⁶	12 ¹²	33 ³³	15 ¹⁵	37 ³⁷	21 ²¹
30.7	36.30	38.0	8.04	15.5	13.00	10.3	52.12	7.2
ne 9.7	37.38 ¹⁰⁸	38.6 ⁶	8.39 ³⁵	14.6 ⁹	13.32 ³²	8.9 ¹⁴	52.46 ³⁴	9.7 ²⁵
19.6	38.37 ⁹⁹	39.6 ¹⁰	8.71 ³²	14.0 ⁶	13.62 ³⁰	7.6 ¹³	52.78 ³²	12.6 ²⁹
29.6	39.26 ⁸⁹	41.1 ¹⁵	9.01 ³⁰	13.6 ⁴	13.89 ²⁷	6.4 ¹²	53.06 ²⁸	15.7 ³¹
ly 9.6	40.01 ⁷⁵	43.0 ¹⁹	9.27 ²⁶	13.4 ²	14.13 ²⁴	5.5 ⁹	53.29 ²³	19.0 ³³
	61 ⁶¹	22 ²²	22 ²²	1 ¹	20 ²⁰	8 ⁸	18 ¹⁸	34 ³⁴
19.5	40.62	45.2	9.49	13.5	14.33	4.7	53.47	22.4
29.5	41.06 ⁴⁴	47.6 ²⁴	9.67 ¹⁸	13.8 ³	14.49 ¹⁶	4.1 ⁶	53.60 ¹³	25.8 ³⁴
ig. 8.5	41.32 ²⁶	50.2 ²⁶	9.79 ¹²	14.4 ⁶	14.60 ¹¹	3.8 ³	53.67 ⁷	29.1 ³³
18.5	41.39 ⁷	52.9 ²⁷	9.85 ⁶	15.1 ⁷	14.67 ⁷	3.7 ¹	53.69 ²	32.3 ³²
28.4	41.27 ¹²	55.6 ²⁷	9.87 ²	16.0 ⁹	14.69 ²	3.7 ⁰	53.65 ⁴	35.4 ³¹
	29 ²⁹	26 ²⁶	4 ⁴	9 ⁹	3 ³	2 ²	9 ⁹	27 ²⁷
pt. 7.4	40.98	58.2	9.83	16.9	14.66	3.9	53.56	38.1
17.4	40.51 ⁴⁷	60.6 ²⁴	9.75 ⁸	17.9 ¹⁰	14.60 ⁶	4.2 ³	53.43 ¹³	40.5 ²⁴
27.4	39.90 ⁶¹	62.7 ²¹	9.63 ¹²	18.9 ¹⁰	14.50 ¹⁰	4.6 ⁴	53.26 ¹⁷	42.6 ²¹
t. 7.3	39.17 ⁷³	64.3 ¹⁶	9.48 ¹⁵	19.8 ⁹	14.37 ¹³	5.1 ⁵	53.05 ²¹	44.3 ¹⁷
17.3	38.35 ⁸²	65.5 ¹²	9.31 ¹⁷	20.6 ⁸	14.23 ¹⁴	5.5 ⁴	52.83 ²²	45.6 ¹³
	88 ⁸⁸	7 ⁷	18 ¹⁸	6 ⁶	15 ¹⁵	5 ⁵	24 ²⁴	8 ⁸
27.3	37.47	66.2	9.13	21.2	14.08	6.0	52.59	46.4
w. 6.2	36.58 ⁸⁹	66.3 ¹	8.96 ¹⁷	21.6 ⁴	13.93 ¹⁵	6.5 ⁵	52.34 ²⁵	46.7 ³
16.2	35.72 ⁸⁶	65.8 ⁵	8.79 ¹⁷	21.9 ³	13.79 ¹⁴	6.9 ⁴	52.11 ²³	46.5 ²
26.2	34.92 ⁸⁰	64.7 ¹¹	8.65 ¹⁴	21.9 ⁰	13.67 ¹²	7.2 ³	51.89 ²²	45.9 ⁶
x. 6.2	34.21 ⁷¹	63.0 ¹⁷	8.53 ¹²	21.6 ³	13.57 ¹⁰	7.4 ²	51.69 ²⁰	44.7 ¹²
	59 ⁵⁹	21 ²¹	8 ⁸	4 ⁴	6 ⁶	2 ²	17 ¹⁷	16 ¹⁶
16.1	33.62	60.9	8.45	21.2	13.51	7.6	51.52	43.1
26.1	33.18 ⁴⁴	58.4 ²⁵	8.41 ⁴	20.6 ⁶	13.47 ⁴	7.7 ¹	51.38 ¹⁴	41.1 ²⁰
36.1	32.90 ²⁸	55.5 ²⁹	8.40 ¹	19.7 ⁹	13.46 ¹	7.7 ⁰	51.29 ⁹	38.7 ²⁴
3, Tan δ	4.566	-4.455	1.187	-0.639	1.049	-0.317	1.381	+0.952
a Place	27°.658	58''.34	4°.887	26''.42	10°.251	16''.91	50°.312	18''.07
1, D ₀₀ α	+0.09	+0.20	+0.01	+0.03	+0.01	+0.02	-0.02	-0.05
1, D ₀₀ δ	+0.3	-0.7	+0.3	-0.7	+0.3	-0.7	+0.3	-0.7

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	61 Cygni <i>pr.</i> Mag. 5.6			γ Aquari. Mag. 4.5			Bradley 2777. Mag. 5.9			3 Piscis Australis. Mag. 5.6		
	Right Ascension.		Declination N.	Right Ascension.		Declination S.	Right Ascension.		Declination N.	Right Ascension.		Declination S.
	h m	s	'	h m	s	'	h m	s	'	h m	s	'
	21	3	+38 19	21	4	-11 42	21	7	+77 46	21	8	-27 57
Jan. 1.1	3.83		54.5	57.46		65.3	6.52		64.3	14.70		69.5
11.1	3.79	4	52.1 ²⁴	57.48	2	65.6 ³	5.93 ⁵⁹		61.7 ²⁶	14.71	1	68.8 ⁷
21.0	3.80	1	49.6 ²⁵	57.52	4	65.8 ²	5.52 ⁴¹		58.7 ³⁰	14.75	4	68.0 ⁸
31.0	3.85	5	47.1 ²⁵	57.60	8	65.8 ⁰	5.28 ²⁴		55.5 ³²	14.83	8	67.1 ⁹
Feb. 10.0	3.94	9	44.6 ²⁵	57.71	11	65.8 ⁰	5.24 ⁴		52.3 ³²	14.95	12	66.0 ¹¹
		13	23		14	2		16			15	12
20.0	4.07	18	42.3	57.85		65.6	5.40		49.1	15.10		64.8
Mar. 1.9	4.25		40.2 ²¹	58.01	16	65.2 ⁴	5.75 ³⁵		46.0 ³¹	15.28	18	63.5 ¹³
11.9	4.48	23	38.4 ¹⁸	58.21	20	64.6 ⁶	6.28 ⁵³		43.2 ²⁸	15.50	22	62.0 ¹⁵
21.9	4.74	26	37.1 ¹³	58.44	23	63.8 ⁸	6.96 ⁶⁸		40.9 ²³	15.74	24	60.5 ¹⁵
31.9	5.03	29	36.3 ⁸	58.69	25	62.8 ¹⁰	7.79 ⁸³		39.0 ¹⁹	16.02	28	58.9 ¹⁶
		32	2		27	11		93			29	
Apr. 10.8	5.35		36.1	58.96		61.7	8.72		37.7	16.31		57.3
20.8	5.70	35	36.4 ³	59.25	29	60.4 ¹³	9.73 ¹⁰¹		37.0 ⁷	16.63	32	55.6 ¹⁷
30.8	6.06	36	37.2 ⁸	59.56	31	58.9 ¹⁵	10.78 ¹⁰⁵		36.9 ¹	16.97	34	54.0 ¹⁶
May 10.7	6.43	37	38.6 ¹⁴	59.88	32	57.3 ¹⁶	11.84 ¹⁰⁶		37.4 ⁵	17.32	35	52.4 ¹⁶
20.7	6.79	36	40.4 ¹⁸	60.20	32	55.7 ¹⁶	12.87 ¹⁰³		38.6 ¹²	17.67	35	50.9 ¹⁵
		36	23		32	17		97			35	13
30.7	7.15		42.7	60.52		54.0	13.84		40.3	18.02		49.6
June 9.7	7.49	34	45.4 ²⁷	60.83	31	52.4 ¹⁶	14.73 ⁸⁹		42.5 ²²	18.36	34	48.5 ¹¹
19.6	7.79	30	48.3 ²⁹	61.12	29	50.8 ¹⁶	15.51 ⁷⁸		45.2 ²⁷	18.68	32	47.5 ¹⁰
29.6	8.07	28	51.4 ³¹	61.39	27	49.4 ¹⁴	16.15 ⁶⁴		48.3 ³¹	18.98	30	46.8 ⁷
July 9.6	8.30	23	54.7 ³³	61.63	24	48.1 ¹³	16.65 ⁵⁰		51.6 ³³	19.24	26	46.3 ⁵
		18	34		20	11		34			23	2
19.6	8.48		58.1	61.83		47.0	16.99		55.2	19.47		46.1 ⁰
29.5	8.62	14	61.4 ³³	61.99	16	46.1 ⁹	17.16 ¹⁷		58.9 ³⁷	19.64	17	46.1 ³
Aug. 8.5	8.70	8	64.7 ³³	62.10	11	45.4 ⁷	17.16 ⁰		62.6 ³⁷	19.77	13	46.4 ³
18.5	8.73	3	67.8 ³¹	62.16	6	44.9 ⁵	17.00 ¹⁶		66.4 ³⁸	19.85	8	46.9 ⁵
28.4	8.71	2	70.7 ²⁹	62.18	2	44.6 ³	16.67 ³³		70.0 ³⁶	19.87	2	47.5 ⁷
		6	26		2	1		49			2	
Sept. 7.4	8.65		73.3	62.16		44.5	16.18		73.4	19.85		48.2 ⁸
17.4	8.54	11	75.6 ²³	62.10	6	44.5 ⁰	15.56 ⁶²		76.6 ³²	19.79	6	49.0 ⁹
27.4	8.39	15	77.6 ²⁰	62.01	9	44.7 ²	14.81 ⁷⁵		79.5 ²⁹	19.69	10	49.9 ⁸
Oct. 7.3	8.22	17	79.2 ¹⁶	61.89	12	44.9 ²	13.95 ⁸⁶		81.9 ²⁴	19.55	14	50.7 ⁸
17.3	8.02	20	80.3 ¹¹	61.75	14	45.2 ³	13.01 ⁹⁴		84.0 ²¹	19.40	15	51.5 ⁷
		20	8		14	4		101			16	
27.3	7.82		81.1	61.61		45.6	12.00		85.5	19.24		52.2 ⁵
Nov. 6.3	7.61	21	81.3 ²	61.47	14	46.1 ⁵	10.95 ¹⁰⁵		86.6 ¹¹	19.07	17	52.7 ⁵
16.2	7.41	20	81.1 ²	61.33	14	46.5 ⁴	9.90 ¹⁰⁵		87.0 ⁴	18.92	15	53.0 ³
26.2	7.23	18	80.5 ⁶	61.21	12	46.9 ⁴	8.86 ¹⁰⁴		86.9 ¹	18.78	14	53.2 ⁰
Dec. 6.2	7.07	16	79.4 ¹¹	61.12	9	47.3 ⁴	7.87 ⁹¹		86.1 ⁸	18.67	11	53.2 ²
		14	15		7	4		91			9	
16.1	6.93		77.9	61.05		47.7	6.96		84.8	18.58		53.0 ⁴
26.1	6.83	10	76.0 ¹⁹	61.01	4	48.0 ³	6.15 ⁸¹		82.9 ¹⁹	18.53	5	52.6 ⁶
36.1	6.77	6	73.8 ²²	61.00	1	48.3 ³	5.48 ⁶⁷		80.6 ²³	18.52	1	52.0 ⁶
Sec δ , Tan δ	1.275		+0.791	1.021		-0.207	4.726		+4.619	1.132		-0.531
Mean Place	5 ^h .095		50 ^m .90	57 ^h .907		58 ^m .97	13 ^h .487		54 ^m .83	15 ^h .080		59 ^m .99
D ψ δ , D ω α	-0.01		-0.04	0.00		+0.01	-0.08		-0.22	+0.01		+0.03
D ψ δ , D ω δ	+0.3		-0.7	+0.3		-0.7	+0.3		-0.7	+0.3		-0.7

FOR THE UPPER TRANSIT AT WASHINGTON.

Solar date.	ζ Cygni. Mag. 3.4		τ Cygni. Mag. 3.8		α Equulei. Mag. 4.1		σ Cygni. Mag. 4.3	
	Right Ascension.	Declina- tion N.	Right Ascension.	Declina- tion N.	Right Ascension.	Declina- tion N.	Right Ascension.	Declina- tion N.
	h m 21 9	° ' " + 29 52	h m 21 11	° ' " + 37 40	h m 21 11	° ' " + 4 53	h m 21 14	° ' " + 39 2
	s 18.09	" 42.4	s 22.65	" 59.9	s 33.95	" 42.5	s 3.37	" 21.9
I. I.1	18.06 3	40.2 22	22.60 5	57.6 23	33.95 0	41.3 12	3.30 7	19.6 23
II.1	18.06 0	38.0 22	22.58 2	55.1 25	33.98 3	40.2 11	3.28 2	17.1 25
21.0	18.10 4	35.7 23	22.61 3	52.5 26	34.04 6	39.2 10	3.30 2	14.4 27
31.0	18.17 7	33.4 23	22.67 6	50.0 25	34.13 9	38.2 10	3.36 6	11.8 26
10.0	18.17 12	31.3 21	22.78 11	47.5 25	34.25 12	37.4 8	3.47 11	9.3 25
20.0	18.29 15	29.5 18	22.94 16	45.3 22	34.41 16	36.9 5	3.62 15	7.1 22
I. 1.9	18.44 19	27.9 16	23.14 20	43.5 18	34.59 18	36.6 3	3.82 20	5.2 19
II.9	18.63 23	26.8 11	23.38 24	42.1 14	34.80 21	36.6 0	4.06 24	3.7 15
21.9	18.86 26	26.1 7	23.65 27	41.1 10	35.04 24	36.9 3	4.33 27	2.6 11
31.9	19.12 28	25.9 2	23.95 30	40.7 4	35.30 26	37.5 6	4.64 31	2.1 5
10.8	19.40 31	26.3 4	24.28 33	40.8 1	35.58 28	38.5 10	4.97 33	2.2 1
20.8	19.71 33	27.1 8	24.63 35	41.5 7	35.88 30	39.7 12	5.32 35	2.8 6
30.8	20.04 33	28.4 13	24.99 36	42.7 12	36.19 31	41.3 16	5.68 36	3.9 11
Iy 10.7	20.37 34	30.1 17	25.35 36	44.3 16	36.51 32	43.0 17	6.04 36	5.5 16
20.7	20.71 33	32.2 21	25.70 35	46.4 21	36.82 31	44.9 19	6.40 36	7.6 21
30.7	21.04 32	34.6 24	26.03 33	48.9 25	37.12 30	47.0 21	6.74 34	10.1 25
ne 9.7	21.36 29	37.2 26	26.34 31	51.7 28	37.40 28	49.1 21	7.05 31	12.8 27
19.6	21.65 26	40.1 29	26.61 27	54.7 30	37.66 26	51.2 21	7.33 28	15.8 30
29.6	21.91 23	43.1 30	26.85 24	57.8 31	37.89 23	53.3 21	7.57 24	19.0 32
Iy 9.6	22.14 19	46.0 29	27.04 19	61.1 33	38.08 19	55.3 20	7.77 20	22.2 32
19.6	22.33 14	49.0 30	27.18 14	64.3 32	38.24 16	57.1 18	7.91 14	25.5 33
29.5	22.47 9	51.9 29	27.27 9	67.5 32	38.35 11	58.8 17	8.00 9	28.7 32
ug. 8.5	22.56 0	54.6 27	27.31 4	70.6 31	38.41 6	60.2 14	8.04 4	31.8 31
18.5	22.60 4	57.1 25	27.30 1	73.4 28	38.43 2	61.5 13	8.03 1	34.7 29
28.4	22.60 5	65.8 23	27.43 6	83.9 26	38.57 2	62.5 10	8.07 6	37.4 27
pt. 7.4	22.55 9	61.4 20	27.24 11	78.3 23	38.41 6	62.5 8	7.97 11	37.4 24
17.4	22.46 12	63.0 16	27.13 14	78.3 20	38.35 9	63.3 6	7.86 14	39.8 20
27.4	22.34 15	64.3 13	26.99 17	80.3 16	38.26 12	63.9 4	7.72 17	41.8 16
st. 7.3	22.19 17	65.3 10	26.82 19	81.9 12	38.14 13	64.3 2	7.55 20	43.4 13
17.3	22.02 18	66.6 5	26.63 20	83.1 8	38.01 14	64.5 1	7.35 21	44.7 8
27.3	21.84 18	65.8 2	26.43 21	83.9 3	37.87 14	64.4 2	7.14 21	45.5 4
ov. 6.3	21.68 18	66.0 3	26.22 21	84.2 1	37.73 14	64.2 2	6.93 21	45.9 1
16.2	21.46 16	65.7 7	26.01 19	84.1 6	37.59 12	63.8 6	6.72 20	45.8 6
26.2	21.32 15	65.0 10	25.82 17	83.5 11	37.47 10	63.2 8	6.52 18	45.2 10
ec. 6.2	21.17 12	64.0 14	25.65 15	82.4 14	37.37 8	62.4 9	6.34 15	44.2 15
16.1	21.05 9	62.6 17	25.50 12	81.0 19	37.29 5	61.5 10	6.19 13	42.7 18
26.1	20.96 6	60.9 20	25.38 8	79.1 21	37.24 2	60.5 11	6.06 8	40.9 22
36.1	20.90	58.9	25.30	77.0	37.22	59.4	5.98	38.7
δ , Tan δ in Place	1.153 19°.072	+0.575 39''.67	1.264 23°.848	+0.772 55''.52	1.004 34°.507	+0.086 45''.02	1.288 4°.592	+0.811 17''.08
α , D_{α} α	-0.01	-0.03	-0.01	-0.04	0.00	0.00	-0.01	-0.04
δ , D_{δ} δ	+0.3	-0.7	+0.3	-0.7	+0.3	-0.7	+0.3	-0.7

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	θ^1 Microscopii. Mag. 4.9		α Cephei. Mag. 2.6		ι Capricorni. Mag. 4.3		ι Pegasi. Mag. 4.2	
	Right Ascension.	Declination S.	Right Ascension.	Declination N.	Right Ascension.	Declination S.	Right Ascension.	Declination N.
	h m	° '	h m	° '	h m	° '	h m	° '
	21 15	-41 9	21 16	+62 13	21 17	-17 11	21 18	+19 26
	s	"	s	"	s	"	s	"
Jan. 1.1	19.22	81.9	30.46	39.3	30.60	57.0	8.58	26.1
11.1	19.22	80.6 ¹³	30.25 ²¹	36.7 ²⁶	30.60 ⁰	57.0 ⁰	8.56 ²	24.4 ¹⁷
21.1	19.25 ³	79.0 ¹⁶	30.11 ¹⁴	33.8 ²⁹	30.63 ³	56.8 ²	8.57 ¹	22.6 ¹⁸
31.0	19.33 ⁸	77.3 ¹⁷	30.06 ⁵	30.7 ³²	30.70 ⁷	56.5 ³	8.61 ⁴	20.8 ¹⁸
Feb. 10.0	19.45 ¹²	75.4 ¹⁹	30.08 ²	27.5 ³¹	30.80 ¹⁰	56.1 ⁴	8.69 ⁸	19.1 ¹⁷
	16	20	10	31	13	6	11	16
20.0	19.61	73.4	30.18	24.4	30.93	55.5	8.80	17.5
Mar. 1.9	19.81	71.3	30.37	21.5 ²⁹	31.09	54.8	8.94	16.1
11.9	20.04 ²³	69.2 ²¹	30.63 ²⁶	18.9 ²⁶	31.28 ¹⁹	53.9 ⁹	9.12 ¹⁸	15.1 ¹⁰
21.9	20.31 ²⁷	67.1 ²¹	30.97 ³⁴	16.7 ²²	31.50 ²²	52.8 ¹¹	9.33 ²¹	14.4 ⁷
31.9	20.62 ³¹	65.0 ²¹	31.37 ⁴⁰	15.0 ¹⁷	31.74 ²⁴	51.6 ¹²	9.57 ²⁴	14.1 ³
	33	20	46	12	28	14	26	1
Apr. 10.8	20.95	63.0	31.83	13.8	32.02	50.2	9.83	14.2
20.8	21.31 ³⁶	61.1 ¹⁹	32.33 ⁵⁰	13.3 ⁵	32.31 ²⁹	48.7 ¹⁵	10.12 ²⁹	14.7 ⁵
30.8	21.69 ³⁸	59.4 ¹⁷	32.85 ⁵²	13.4 ¹	32.62 ³¹	47.1 ¹⁶	10.43 ³¹	15.7 ¹⁰
May 10.8	22.09 ⁴⁰	57.8 ¹⁶	33.39 ⁵⁴	14.1 ⁷	32.95 ³³	45.4 ¹⁷	10.75 ³²	17.1 ¹⁴
20.7	22.49 ⁴⁰	56.4 ¹⁴	33.92 ⁵³	15.4 ¹³	33.28 ³³	43.8 ¹⁶	11.07 ³²	18.9 ¹⁸
	40	10	51	18	33	16	32	20
30.7	22.89	55.4	34.43	17.2	33.61	42.2	11.39	20.9
June 9.7	23.28 ³⁹	54.6 ⁸	34.91 ⁴⁸	19.6 ²⁴	33.93 ³²	40.6 ¹⁶	11.70 ³¹	23.2 ²³
19.6	23.65 ³⁷	54.1 ⁵	35.34 ⁴³	22.3 ²⁷	34.23 ³⁰	39.2 ¹⁴	11.99 ²⁹	25.6 ²⁴
29.6	23.99 ³⁴	53.9 ²	35.72 ³⁸	25.5 ³²	34.52 ²⁹	38.0 ¹²	12.25 ²⁶	28.2 ²⁶
July 9.6	24.29 ³⁰	54.0 ¹	36.03 ³¹	28.9 ³⁴	34.77 ²⁵	36.9 ¹¹	12.48 ²³	30.8 ²⁶
	26	5	24	36	21	8	20	27
19.6	24.55	54.5	36.27	32.5	34.98	36.1	12.68	33.5
Aug. 29.5	24.75 ²⁰	55.2 ⁷	36.44 ¹⁷	36.2 ³⁷	35.15 ¹⁷	35.4 ⁷	12.83 ¹⁵	36.0 ¹⁸
8.5	24.91 ¹⁶	56.2 ¹⁰	36.52 ⁸	39.9 ³⁷	35.28 ¹³	35.0 ⁴	12.94 ¹¹	38.4 ¹⁴
18.5	25.00 ⁹	57.4 ¹²	36.51 ¹	43.6 ³⁷	35.36 ⁸	34.8 ²	13.00 ⁶	40.7 ¹³
28.5	25.03 ³	58.7 ¹³	36.43 ⁸	47.1 ³⁵	35.40 ⁴	34.8 ⁰	13.02 ²	42.8 ²¹
	2	14	15	33	1	2	3	18
Sept. 7.4	25.01	60.1	36.28	50.4	35.39	35.0	12.99	44.6
17.4	24.93 ⁸	61.5 ¹⁴	36.05 ²³	53.5 ³¹	35.34 ⁵	35.3 ³	12.93 ⁶	46.1 ¹⁵
27.4	24.81 ¹²	62.9 ¹⁴	35.77 ²⁸	56.2 ²⁷	35.25 ⁹	35.7 ⁴	12.83 ¹⁰	47.4 ¹³
Oct. 7.3	24.65 ¹⁶	64.2 ¹³	35.43 ³⁴	58.5 ²³	35.14 ¹¹	36.2 ⁵	12.70 ¹³	48.4 ¹⁰
17.3	24.47 ¹⁸	65.3 ¹¹	35.06 ³⁷	60.4 ¹⁹	35.00 ¹⁴	36.7 ⁵	12.56 ¹⁴	49.0 ⁶
	20	8	40	14	14	5	15	4
27.3	24.27	66.1	34.66	61.8	34.86	37.2	12.41	49.4
Nov. 6.3	24.07 ²⁰	66.7 ⁶	34.24 ⁴²	62.7 ⁹	34.71 ¹⁵	37.7 ⁵	12.25 ¹⁶	49.4 ⁰
16.2	23.87 ²⁰	67.0 ³	33.82 ⁴²	63.0 ³	34.57 ¹⁴	38.2 ⁵	12.10 ¹⁵	49.1 ³
26.2	23.69 ¹⁸	67.0 ⁰	33.41 ⁴¹	62.7 ³	34.45 ¹²	38.6 ⁴	11.96 ¹⁴	48.5 ⁶
Dec. 6.2	23.54 ¹⁵	66.6 ⁴	33.02 ³⁹	61.9 ⁸	34.35 ¹⁰	38.9 ³	11.84 ¹²	47.6 ⁹
	12	7	35	14	8	2	10	12
16.2	23.42	65.9	32.67	60.5	34.27	39.1	11.74	46.4
26.1	23.35 ⁷	65.0 ⁹	32.37 ³⁰	58.6 ¹⁹	34.22 ⁵	39.2 ¹	11.67 ⁷	45.0 ¹⁴
36.1	23.31 ⁴	63.8 ¹²	32.12 ²⁵	56.2 ²⁴	34.20 ²	39.2 ⁰	11.62 ⁵	43.4 ¹⁶
Sec δ , Tan δ	1.328	-0.874	2.146	+1.899	1.047	-0.310	1.060	+0.353
Mean Place	19 ^h .599	70 ^m .24	33 ^h .153	30 ^m .51	30 ^h .963	49 ^m .76	9 ^h .316	35 ^m .06
D ['] ϕ δ , D ₀ δ	+0.02	+0.04	-0.03	-0.10	+0.01	+0.02	-0.01	-0.02
D ₀ δ , D ₀ δ	+0.3	-0.7	+0.3	-0.7	+0.3	-0.7	+0.3	-0.6

FOR THE UPPER TRANSIT AT WASHINGTON.

Solar etc.	γ Pavonis. Mag. 4.3		ζ Capricorni. Mag. 3.9		ϵ Cygni. Mag. 5.3		β Aquarii. Mag. 3.1	
	Right Ascension.	Declina- tion S.	Right Ascension.	Declina- tion S.	Right Ascension.	Declina- tion N.	Right Ascension.	Declina- tion S.
	h m 21 19	° ' " -65 44	h m 21 21	° ' " -22 46	h m 21 26	° ' " +46 9	h m 21 27	° ' " - 5 56
1. 1.1	25.08	81.1	48.70	56.8	17.26	62.7	4.73	49.1
11.1	24.98	78.5	48.70	56.4	17.16	60.3	4.72	49.7
21.1	24.97	75.7	48.73	55.9	17.10	57.7	4.74	50.2
31.0	25.04	72.7	48.79	55.3	17.09	54.9	4.79	50.5
b. 10.0	25.19	69.6	48.89	54.5	17.13	52.1	4.88	50.8
20.0	25.42	66.4	49.02	53.6	17.22	49.4	4.99	50.9
11.9	25.73	63.2	49.18	52.5	17.36	46.8	5.13	50.8
11.9	26.11	60.2	49.37	51.3	17.56	44.6	5.30	50.5
21.9	26.56	57.2	49.60	49.9	17.80	42.8	5.50	49.9
31.9	27.06	54.5	49.85	48.4	18.09	41.4	5.73	49.1
pr. 10.8	27.62	52.1	50.13	46.8	18.41	40.6	5.99	48.1
20.8	28.22	49.9	50.43	45.2	18.77	40.4	6.27	46.8
30.8	28.85	48.1	50.75	43.5	19.15	40.7	6.57	45.4
ay 10.8	29.50	46.7	51.08	41.8	19.54	41.6	6.88	43.7
20.7	30.16	45.7	51.42	40.2	19.93	43.1	7.20	42.0
30.7	30.82	45.2	51.76	38.6	20.32	45.0	7.52	40.2
me 9.7	31.46	45.1	52.09	37.2	20.70	47.4	7.83	38.3
19.6	32.06	45.4	52.41	36.0	21.04	50.1	8.12	36.5
29.6	32.61	46.1	52.70	35.0	21.35	53.1	8.40	34.8
ly 9.6	33.10	47.3	52.96	34.2	21.62	56.4	8.64	33.2
19.6	33.51	48.9	53.19	33.6	21.83	59.8	8.85	31.7
29.5	33.84	50.7	53.37	33.3	22.00	63.2	9.02	30.4
18.5	34.19	55.1	53.60	33.3	22.15	70.0	9.24	28.4
28.5	34.21	57.5	53.64	33.6	22.14	73.2	9.28	27.7
pt. 7.4	34.13	59.9	53.63	34.1	22.08	76.2	9.28	27.3
17.4	33.96	62.1	53.58	34.7	21.97	78.9	9.24	27.0
27.4	33.70	64.2	53.50	35.4	21.81	81.3	9.16	26.9
17.3	33.37	66.0	53.38	36.1	21.62	83.2	9.06	26.9
27.3	32.99	67.4	53.24	36.8	21.40	84.8	8.94	27.1
27.3	32.57	68.4	53.09	37.4	21.17	86.0	8.80	27.4
iv. 6.3	32.14	68.9	52.94	38.0	20.92	86.6	8.66	27.8
16.2	31.71	68.9	52.79	38.4	20.68	86.8	8.53	28.3
26.2	31.30	68.4	52.66	38.7	20.44	86.4	8.41	28.8
ic. 6.2	30.94	67.3	52.55	38.9	20.22	85.5	8.31	29.3
16.2	30.64	65.8	52.46	38.9	20.02	84.2	8.23	29.9
26.1	30.41	63.8	52.41	38.8	19.86	82.4	8.17	30.4
36.1	30.25	61.4	52.38	38.6	19.73	80.2	8.14	31.0
δ , Tan δ	2.435	-2.220	1.085	-0.420	1.444	+1.042	+1.005	-0.104
n Place	25°.871	66°.49	49°.032	48°.36	18°.716	55°.50	5°.123	44°.59
α , D_{α}	+0.04	+0.11	+0.01	+0.02	-0.02	-0.05	0.00	+0.01
δ , D_{δ}	+0.3	-0.6	+0.3	-0.6	+0.3	-0.6	+0.3	-0.6

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	β Cephei. Mag. 3.3		ξ Aquarii. Mag. 4.8		74 Cygni. Mag. 5.1		γ Capricorni. Mag. 3.8	
	Right Ascension.	Declination N.	Right Ascension.	Declination S.	Right Ascension.	Declination N.	Right Ascension.	Declination S.
	h m	° '	h m	° '	h m	° '	h m	° '
	21 27	+70 10	21 33	- 8 13	21 33	+40 1	21 35	-17 2
	s	"	s	"	s	"	s	"
Jan. 1.1	30.27	85.5	13.34	74.3	31.31	58.8	22.73	55.2
11.1	29.91 ³⁶	83.0 ²⁵	13.33 ¹	74.7 ⁴	31.23 ⁸	56.6 ²²	22.72 ¹	55.2
21.1	29.65 ²⁶	80.1 ²⁹	13.35 ²	75.1 ⁴	31.18 ⁵	54.2 ²⁴	22.73 ¹	55.0
31.0	29.50 ¹⁵	77.0 ³¹	13.40 ⁵	75.3 ²	31.18 ⁰	51.6 ²⁶	22.78 ⁵	54.7
Feb. 10.0	29.46 ⁴	73.8 ³²	13.47 ⁷	75.4 ¹	31.21 ³	49.0 ²⁶	22.86 ⁸	54.2
	8	32	11	1	9	25	11	6
20.0	29.54	70.6	13.58	75.3	31.30	46.5	22.97	53.6
Mar. 2.0	29.73 ¹⁹	67.5 ³¹	13.72 ¹⁴	75.1 ²	31.43 ¹³	44.2 ²³	23.11 ¹⁴	52.8
11.9	30.04 ³¹	64.7 ²⁸	13.89 ¹⁷	74.6 ⁵	31.61 ¹⁸	42.2 ²⁰	23.29 ¹⁸	51.9
21.9	30.45 ⁴¹	62.3 ²⁴	14.08 ¹⁹	73.9 ⁷	31.83 ²²	40.6 ¹⁶	23.49 ²⁰	50.8
31.9	30.96 ⁵¹	60.4 ¹⁹	14.31 ²³	73.0 ⁹	32.08 ²⁵	39.4 ¹²	23.72 ²³	49.5
	58	14	25	11	30	7	26	15
Apr. 10.8	31.54	59.0	14.56	71.9	32.38	38.7	23.98	48.0
20.8	32.18 ⁶⁴	58.1 ⁹	14.84 ²⁸	70.6 ¹³	32.71 ³³	38.6 ¹	24.27 ²⁹	46.4
30.8	32.86 ⁶⁸	57.9 ²	15.14 ³⁰	69.1 ¹⁵	33.06 ³⁵	39.0 ⁴	24.57 ³⁰	44.7
May 10.8	33.56 ⁷⁰	58.3 ⁴	15.45 ³¹	67.4 ¹⁷	33.42 ³⁶	40.0 ¹⁰	24.89 ³²	43.0
20.7	34.25 ⁶⁹	59.4 ¹¹	15.77 ³²	65.6 ¹⁸	33.79 ³⁷	41.4 ¹⁴	25.22 ³³	41.1
	67	16	32	18	37	19	33	17
30.7	34.92	61.0	16.09	63.8	34.16	43.3	25.55	39.5
June 9.7	35.55 ⁶³	63.1 ²¹	16.41 ³²	62.0 ¹⁸	34.51 ³⁵	45.7 ²⁴	25.88 ³³	37.9
19.7	36.12 ⁵⁷	65.7 ²⁶	16.71 ³⁰	60.3 ¹⁷	34.84 ³³	48.3 ²⁶	26.19 ³¹	36.4
29.6	36.62 ⁵⁰	68.7 ³⁰	16.99 ²⁸	58.6 ¹⁷	35.14 ³⁰	51.2 ²⁹	26.49 ³⁰	35.1
July 9.6	37.03 ⁴¹	72.0 ³³	17.24 ²⁵	57.1 ¹⁵	35.40 ²⁶	54.4 ³²	26.75 ²⁶	33.9
	32	36	22	14	22	32	23	9
19.6	37.35	75.6	17.46	55.7	35.62	57.6	26.98	33.0
29.5	37.56 ²¹	79.3 ³⁷	17.64 ¹⁸	54.5 ¹²	35.79 ¹⁷	60.9 ³³	27.17 ¹⁹	32.3
Aug. 8.5	37.66 ¹⁰	83.1 ³⁸	17.77 ¹³	53.5 ¹⁰	35.91 ¹²	64.2 ³³	27.31 ¹⁰	31.8
18.5	37.65 ¹	86.8 ³⁷	17.86 ⁹	52.8 ⁷	35.97 ⁶	67.3 ³¹	27.41 ¹⁴	31.6
28.5	37.54 ¹¹	90.5 ³⁷	17.91 ⁵	52.2 ⁶	35.99 ²	70.3 ³⁰	27.46 ⁵	31.6
	21	35	1	3	4	28	1	1
Sept. 7.4	37.33	94.0	17.92	51.9	35.95	73.1	27.47	31.7
17.4	37.02 ³¹	97.3 ³³	17.88 ⁴	51.7 ²	35.86 ⁹	75.6 ²⁵	27.44 ³	32.0
27.4	36.63 ³⁹	100.3 ³⁰	17.81 ⁷	51.7 ⁰	35.74 ¹²	77.8 ²²	27.36 ⁸	32.5
Oct. 7.4	36.17 ⁴⁶	102.9 ²⁶	17.71 ¹⁰	51.9 ²	35.58 ¹⁶	79.7 ¹⁹	27.26 ¹⁰	33.0
17.3	35.65 ⁵²	105.1 ²²	17.59 ¹²	52.2 ³	35.40 ¹⁸	81.2 ¹⁵	27.14 ¹²	33.6
	57	17	13	3	20	10	14	6
27.3	35.08	106.8	17.46	52.5	35.20	82.2	27.00	34.2
Nov. 6.3	34.49 ⁵⁹	108.0 ¹²	17.33 ¹³	52.9 ⁴	34.99 ²¹	82.8 ⁶	26.86 ¹⁴	34.7
16.2	33.88 ⁶¹	108.6 ⁶	17.20 ¹³	53.4 ⁵	34.78 ²¹	82.9 ¹	26.72 ¹⁴	35.2
26.2	33.27 ⁶¹	108.6 ⁰	17.07 ¹³	53.9 ⁵	34.58 ²⁰	82.5 ⁴	26.60 ¹²	35.7
Dec. 6.2	32.70 ⁵⁷	108.0 ⁶	16.97 ¹⁰	54.4 ⁵	34.39 ¹⁹	81.7 ⁸	26.49 ¹¹	36.0
	54	11	8	5	17	13	9	3
16.2	32.16	106.9	16.89	54.9	34.22	80.4	26.40	36.3
26.1	31.67 ⁴⁹	105.2 ¹⁷	16.83 ⁶	55.4 ⁵	34.08 ¹⁴	78.7 ¹⁷	26.34 ⁶	36.4
36.1	31.26 ⁴¹	102.9 ²³	16.80 ³	55.9 ⁵	33.98 ¹⁰	76.7 ²⁰	26.31 ³	36.5
Sec δ , Tan δ	2.951	+2.776	1.010	-0.145	1.306	+0.840	1.046	-0.397
Mean Place	34°.161	74''.66	13°.698	69''.39	32°.484	52''.30	23°.022	48''.24
$D'_{\psi} \alpha$, $D_{\omega} \alpha$	-0.05	-0.15	0.00	+0.01	-0.01	-0.04	0.00	+0.02
$D'_{\psi} \delta$, $D_{\omega} \delta$	+0.3	-0.6	+0.3	-0.6	+0.3	-0.6	+0.3	-0.6

FOR THE UPPER TRANSIT AT WASHINGTON.

can Solar Date.	λ Octantis. Mag. 5.4		ε Pegasi. Mag. 2.5		11 Cephei. Mag. 4.8		δ Capricorni. Mag. 3.0	
	Right Ascension.	Declination S.	Right Ascension.	Declination N.	Right Ascension.	Declination N.	Right Ascension.	Declination S.
	h m 21 37	° ' " -83 6	h m 21 40	° ' " + 9 28	h m 21 40	° ' " +70 54	h m 21 42	° ' " -16 30
an. I.1	57.49	55.4	0.17	64.9	36.93	83.6	20.81	55.5
11.1	56.74 ⁷⁵	52.4 ³⁰	0.14 ³	63.7 ¹²	36.53 ⁴⁰	81.2 ²⁴	20.79 ²	55.5 ⁰
21.1	56.28 ⁴⁶	49.0 ³⁴	0.14 ⁰	62.4 ¹³	36.22 ³¹	78.5 ²⁷	20.80 ¹	55.3 ²
31.0	56.13 ¹⁵	45.4 ³⁶	0.17 ³	61.2 ¹²	36.02 ²⁰	75.5 ³⁰	20.84 ⁴	55.1 ²
eb. 10.0	56.28 ¹⁵	41.7 ³⁷	0.23 ⁶	60.1 ¹¹	35.94 ⁸	72.3 ³²	20.91 ⁷	54.7 ⁴
	44	37	9	11	4	32	10	6
20.0	56.72	38.0	0.32	59.0	35.98	69.1	21.01	54.1
ar. 2.0	57.45 ⁷³	34.3 ³⁷	0.44 ¹²	58.2 ⁸	36.15 ¹⁷	66.0 ³¹	21.15 ¹⁴	53.3 ⁸
11.9	58.44 ⁹⁹	30.8 ³⁵	0.60 ¹⁶	57.7 ⁵	36.43 ²⁸	63.1 ²⁹	21.31 ¹⁶	52.3 ¹⁰
21.9	59.67 ¹²³	27.4 ³⁴	0.78 ¹⁸	57.5 ²	36.83 ⁴⁰	60.6 ²⁵	21.51 ²⁰	51.2 ¹¹
31.9	61.12 ¹⁴⁵	24.3 ³¹	1.00 ²²	57.6 ¹	37.32 ⁴⁹	58.5 ²¹	21.74 ²³	49.9 ¹³
	163	27	25	4	58	16	25	14
pr. 10.9	62.75 ¹⁷⁸	21.6 ²³	1.25 ²⁷	58.0 ⁸	37.90 ⁶⁵	56.9 ⁹	21.99 ²⁸	48.5 ¹⁶
20.8	64.53 ¹⁸⁹	19.3 ¹⁹	1.52 ²⁹	58.8 ¹²	38.55 ⁷⁰	56.0 ⁴	22.27 ³⁰	46.9 ¹⁷
30.8	66.42 ¹⁹⁷	17.4 ¹⁴	1.81 ³¹	60.0 ¹⁴	39.25 ⁷²	55.6 ⁹	22.57 ³²	45.2 ¹⁸
ay 10.8	68.39 ²⁰⁰	16.0 ⁹	2.12 ³²	61.4 ¹⁷	39.97 ⁷²	55.8 ²	22.89 ³³	43.4 ¹⁷
20.7	70.39 ²⁰⁰	15.1 ⁴	2.44 ³¹	63.1 ²⁰	40.69 ⁷⁰	56.7 ¹⁴	23.22 ³³	41.7 ¹⁸
30.7	72.39 ¹⁹⁵	14.7 ¹	2.75 ³¹	65.1 ²¹	41.39 ⁶⁷	58.1 ²⁰	23.55 ³³	39.9 ¹⁷
me 9.7	74.34 ¹⁸⁴	14.8 ⁷	3.06 ³⁰	67.2 ²²	42.06 ⁶²	60.1 ²⁵	23.88 ³¹	38.2 ¹⁵
19.7	76.18 ¹⁶⁹	15.5 ¹¹	3.36 ²⁸	69.4 ²³	42.68 ⁵⁴	62.6 ²⁹	24.19 ³⁰	36.7 ¹⁴
29.6	77.87 ¹⁵¹	16.6 ¹⁶	3.64 ²⁵	71.7 ²³	43.22 ⁴⁵	65.5 ³²	24.49 ²⁷	35.3 ¹²
ily 9.6	79.38 ¹²⁷	18.2 ²⁰	3.89 ²¹	74.0 ²²	43.67 ³⁶	68.7 ³⁵	24.76 ²³	34.1 ¹⁰
19.6	80.65 ¹⁰⁰	20.2 ²³	4.10 ¹⁸	76.2 ²¹	44.03 ²⁶	72.2 ³⁶	24.99 ¹⁹	33.1 ⁷
29.6	81.65 ⁷⁰	22.5 ²⁶	4.28 ¹³	78.3 ²⁰	44.29 ¹⁴	75.8 ³⁸	25.18 ¹⁵	32.4 ⁵
ig. 8.5	82.35 ³⁷	25.1 ²⁸	4.41 ⁹	80.3 ¹⁸	44.43 ⁴	79.6 ³⁸	25.33 ¹¹	31.9 ³
18.5	82.72 ⁴	27.9 ²⁹	4.50 ⁵	82.1 ¹⁶	44.47 ⁸	83.4 ³⁸	25.44 ⁶	31.6 ¹
28.5	82.76 ²⁹	30.8 ²⁸	4.55 ⁰	83.7 ¹³	44.39 ¹⁸	87.2 ³⁶	25.50 ²	31.5 ²
pt. 7.4	82.47 ⁶²	33.6 ²⁷	4.55 ⁴	85.0 ¹¹	44.21 ²⁸	90.8 ³⁴	25.52 ³	31.7 ³
17.4	81.85 ⁹²	36.3 ²⁵	4.51 ⁷	86.1 ⁹	43.93 ³⁷	94.2 ³¹	25.49 ⁷	32.0 ⁴
27.4	80.93 ¹¹⁹	38.8 ²¹	4.44 ¹⁰	87.0 ⁶	43.56 ⁴⁵	97.3 ²⁷	25.42 ⁹	32.4 ⁵
t. 7.4	79.74 ¹⁴⁰	40.9 ¹⁷	4.34 ¹¹	87.6 ⁴	43.11 ⁵¹	100.0 ¹⁹	25.33 ¹²	32.9 ⁶
17.3	78.34 ¹⁵⁷	42.6 ¹²	4.23 ¹³	88.0 ²	42.60 ⁵⁷	102.4 ¹⁹	25.21 ¹⁴	33.5 ⁶
27.3	76.77 ¹⁶⁷	43.8 ⁶	4.10 ¹⁴	88.2 ¹	42.03 ⁶⁰	104.3 ¹⁴	25.07 ¹⁴	34.1 ⁶
iv. 6.3	75.10 ¹⁷⁰	44.4 ⁰	3.96 ¹⁴	88.1 ³	41.43 ⁶²	105.7 ⁸	24.93 ¹³	34.7 ⁶
16.3	73.40 ¹⁶⁶	44.4 ⁷	3.82 ¹²	87.8 ⁶	40.81 ⁶²	106.5 ⁴	24.80 ¹³	35.3 ⁴
26.2	71.74 ¹⁵⁶	43.7 ¹²	3.70 ¹¹	87.2 ⁷	40.19 ⁶¹	106.7 ⁴	24.67 ¹¹	35.7 ⁴
c. 6.2	70.18 ¹⁴⁰	42.5 ¹⁹	3.59 ¹⁰	86.5 ⁹	39.58 ⁵⁷	106.3 ⁹	24.56 ⁹	36.1 ³
16.2	68.78 ¹¹⁹	40.6 ²³	3.49 ⁷	85.6 ¹⁰	39.01 ⁵²	105.4 ¹⁶	24.47 ⁷	36.4 ²
26.1	67.59 ⁹⁴	38.3 ²⁸	3.42 ⁵	84.6 ¹²	38.49 ⁴⁵	103.8 ²⁰	24.40 ³	36.6 ¹
36.1	66.65	35.5	3.37	83.4	38.04	101.8	24.37	36.7
3, Tan δ	8.336	-8.275	1.014	+0.167	3.059	+2.891	1.043	-0.297
a Place	60°.495	39''.62	0°.661	65''.14	40°.840	71''.41	21°.070	48''.75
a, D _u α	+0.13	+0.45	0.00	-0.01	-0.04	-0.16	0.00	+0.02
b, D _u δ	+0.3	-0.6	+0.3	-0.6	+0.3	-0.6	+0.3	-0.6

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	π^2 Cygni. Mag. 4.3		μ Capricorni. Mag. 5.2		γ Gruis. Mag. 3.2		16 Pegasi. Mag. 5.0	
	Right Ascension.	Declination N.	Right Ascension.	Declination S.	Right Ascension.	Declination S.	Right Ascension.	Declination N.
	h m	° '	h m	° '	h m	° '	h m	° '
	21 43	+48 54	21 48	-13 56	21 48	-37 45	21 49	+25 31
Jan. 1.1	37.62	66.3	39.55	75.1	46.96	66.1	10.91	33.8
11.1	37.49 ¹³	64.1 ²²	39.52 ³	75.2 ¹	46.92 ⁴	65.1 ¹⁰	10.85 ⁶	32.0 ¹⁵
21.1	37.40 ⁹	61.5 ²⁶	39.53 ¹	75.2 ⁰	46.91 ¹	63.8 ¹³	10.83 ²	30.1 ¹²
31.0	37.36 ⁴	58.7 ²⁸	39.56 ³	75.1 ¹	46.94 ³	62.2 ¹⁶	10.83 ⁰	28.1 ¹⁰
Feb. 10.0	37.37 ¹	55.9 ²⁸	39.62 ⁶	74.8 ³	47.01 ⁷	60.5 ¹⁷	10.87 ⁴	26.2 ¹⁹
	37.37 ⁶	55.9 ²⁸	39.62 ¹⁰	74.8 ⁵	47.01 ¹¹	60.5 ¹⁹	10.87 ⁸	26.2 ¹⁸
20.0	37.43 ¹²	53.1 ²⁶	39.72 ¹²	74.3 ⁶	47.12 ¹⁵	58.6 ²⁰	10.95 ¹¹	24.4 ¹⁷
Mar. 2.0	37.55 ¹⁸	50.5 ²⁴	39.84 ¹⁶	73.7 ⁸	47.27 ¹⁹	56.6 ²¹	11.06 ¹⁵	22.7 ¹⁴
11.9	37.73 ²³	48.1 ²⁰	40.00 ¹⁹	72.9 ¹⁰	47.46 ²²	54.5 ²²	11.21 ¹⁸	21.3 ⁷
21.9	37.96 ²⁸	46.1 ¹⁵	40.19 ²²	71.9 ¹²	47.68 ²⁶	52.3 ²²	11.39 ²²	20.3 ⁷
31.9	38.24 ³³	44.6 ¹¹	40.41 ²⁵	70.7 ¹⁴	47.94 ²⁹	50.1 ²²	11.61 ²⁶	19.6 ⁴
Apr. 10.9	38.57 ³⁶	43.5 ⁵	40.66 ²⁷	69.3 ¹⁶	48.23 ³²	47.9 ²²	11.87 ²⁸	19.4 ²
20.8	38.93 ³⁹	43.0 ¹	40.93 ³⁰	67.7 ¹⁷	48.55 ³⁴	45.7 ²¹	12.15 ³⁰	19.6 ⁷
30.8	39.32 ⁴⁰	43.1 ⁷	41.23 ³¹	66.0 ¹⁷	48.89 ³⁷	43.6 ¹⁹	12.45 ³³	20.3 ¹⁰
May 10.8	39.72 ⁴¹	43.8 ¹²	41.54 ³²	64.3 ¹⁸	49.26 ³⁸	41.7 ¹⁷	12.78 ³³	21.4 ¹⁰
20.7	40.13 ⁴¹	45.0 ¹⁸	41.86 ³³	62.5 ¹⁸	49.64 ³⁹	40.0 ¹⁵	13.11 ³³	23.0 ¹⁹
30.7	40.54 ⁴⁰	46.8 ²²	42.19 ³³	60.7 ¹⁸	50.03 ³⁸	38.5 ¹²	13.44 ³³	24.9 ²³
June 9.7	40.94 ³⁷	49.0 ²⁶	42.52 ³³	58.9 ¹⁸	50.41 ³⁷	37.3 ⁹	13.77 ³¹	27.1 ²³
19.7	41.31 ³⁴	51.6 ³⁰	42.83 ³⁰	57.2 ¹⁵	50.78 ³⁵	36.4 ⁶	14.08 ²⁹	29.6 ²⁶
29.6	41.65 ²⁹	54.6 ³²	43.13 ²⁶	55.7 ¹³	51.13 ³¹	35.8 ³	14.37 ²⁶	32.2 ²⁸
July 9.6	41.94 ²⁵	57.8 ³³	43.39 ²⁴	54.4 ¹²	51.44 ²⁸	35.5 ¹	14.63 ²²	35.0 ²⁸
19.6	42.19 ¹⁹	61.1 ³⁵	43.63 ²⁰	53.2 ⁹	51.72 ²³	35.6 ⁴	14.85 ¹⁹	37.8 ²⁸
29.6	42.38 ¹³	64.6 ³⁵	43.83 ¹⁵	52.3 ⁷	51.95 ¹⁹	36.0 ⁷	15.04 ¹⁴	40.6 ²⁷
Aug. 8.5	42.51 ⁷	68.1 ³⁵	43.98 ¹²	51.6 ⁴	52.14 ¹³	36.7 ⁹	15.18 ⁹	43.3 ²⁴
18.5	42.58 ¹	71.6 ³³	44.10 ⁶	51.2 ²	52.27 ⁷	37.6 ¹¹	15.27 ⁴	46.0 ²²
28.5	42.59 ⁴	74.9 ³¹	44.16 ²	51.0 ⁰	52.34 ²	38.7 ¹³	15.31 ¹	48.4 ²²
Sept. 7.4	42.55 ¹⁰	78.0 ²⁹	44.18 ²	51.0 ¹	52.36 ⁴	40.0 ¹⁴	15.32 ⁵	50.6 ¹⁷
17.4	42.45 ¹⁴	80.9 ²⁶	44.16 ⁶	51.1 ³	52.32 ⁸	41.4 ¹⁴	15.27 ⁷	52.6 ¹⁷
27.4	42.31 ¹⁸	83.5 ²³	44.10 ⁹	51.4 ⁴	52.24 ¹²	42.8 ¹⁴	15.20 ¹¹	54.3 ¹³
Oct. 7.4	42.13 ²²	85.8 ¹⁸	44.01 ¹¹	51.8 ⁵	52.12 ¹⁶	44.2 ¹²	15.09 ¹³	55.6 ¹¹
17.3	41.91 ²⁴	87.6 ¹⁴	43.90 ¹³	52.3 ⁶	51.96 ¹⁷	45.4 ¹¹	14.96 ¹⁵	56.7 ⁷
27.3	41.67 ²⁵	89.0 ⁹	43.77 ¹⁴	52.9 ⁵	51.79 ¹⁸	46.5 ⁹	14.81 ¹⁶	57.4 ³
Nov. 6.3	41.42 ²⁶	89.9 ⁴	43.63 ¹³	53.4 ⁶	51.61 ¹⁷	47.4 ⁶	14.65 ¹⁵	57.7 ⁰
16.3	41.16 ²⁵	90.3 ²	43.50 ¹³	54.0 ⁵	51.43 ¹⁷	48.0 ³	14.50 ¹⁵	57.7 ⁴
26.2	40.91 ²⁴	90.1 ⁶	43.37 ¹¹	54.5 ⁴	51.26 ¹⁶	48.3 ⁰	14.35 ¹⁴	57.3 ⁷
Dec. 6.2	40.67 ²²	89.5 ¹²	43.26 ⁹	54.9 ⁴	51.10 ¹³	48.3 ³	14.21 ¹³	56.6 ¹¹
16.2	40.45 ¹⁹	88.3 ¹⁶	43.17 ⁷	55.3 ³	50.97 ¹⁰	48.0 ⁷	14.08 ¹⁰	55.5 ¹²
26.1	40.26 ¹⁶	86.7 ²¹	43.10 ⁴	55.6 ²	50.87 ⁶	47.3 ⁹	13.98 ⁸	54.1 ¹⁰
36.1	40.10	84.6	43.06	55.8	50.81	46.4	13.90	52.5
Sec δ , Tan δ	1.522	+1.147	1.030	-0.248	1.265	-0.775	1.108	+0.478
Mean Place	39°.110	57''.23	39°.795	69''.12	47°.133	54''.84	11°.625	29''.46
D ψ α , D ω α	-0.02	-0.06	0.00	+0.01	+0.01	+0.04	-0.01	-0.03
D ψ δ , D ω δ	+0.3	-0.6	+0.3	-0.5	+0.3	-0.5	+0.3	-0.5

FOR THE UPPER TRANSIT AT WASHINGTON.

an Solar Date.	79 Draconis. Mag. 6.6		ε Indi. Mag. 4.7		20 Pegasi. Mag. 5.7		α Aquarii. Mag. 3.2	
	Right Ascension.	Declina- tion N.	Right Ascension.	Declina- tion S.	Right Ascension.	Declina- tion N.	Right Ascension.	Declina- tion S.
	h m 21 51	° ' " +73 17	h m 21 56	° ' " -57 7	h m 21 56	° ' " +12 42	h m 22 1	° ' " -0 43
n. 1.1	43.42	73.4	51.67	83.4	56.41	45.6	24.84	61.6
11.1	42.92 50	71.2 22	51.57 10	81.5 19	56.37 4	44.3 13	24.80 4	62.3 7
21.1	42.53 39	68.6 26	51.52 5	79.3 22	56.35 2	43.0 13	24.79 1	63.0 7
31.1	42.26 27	65.6 30	51.53 1	76.8 25	56.36 1	41.6 14	24.81 2	63.6 6
b. 10.0	42.12 14	62.5 31	51.60 7	74.1 27	56.40 4	40.3 13	24.85 4	64.1 5
20.0	42.11	59.3	51.73	71.3	56.47	39.2	24.93	64.5
ir. 2.0	42.25 14	56.2 31	51.92 19	68.4 29	56.58 11	38.2 10	25.03 10	64.6 1
11.9	42.53 28	53.2 30	52.16 24	65.5 29	56.72 14	37.5 7	25.17 14	64.5 1
21.9	42.94 41	50.6 26	52.46 30	62.6 29	56.89 17	37.1 4	25.34 17	64.2 3
31.9	43.47 53	48.4 22	52.81 35	59.8 28	57.10 21	37.0 1	25.54 20	63.6 6
ir. 10.9	44.10 63	46.7 17	53.20 39	57.1 27	57.33 23	37.3 3	25.77 23	62.8 8
20.8	44.81 71	45.5 12	53.64 44	54.7 24	57.60 27	38.0 7	26.03 26	61.6 12
30.8	45.58 77	44.9 6	54.12 48	52.5 22	57.88 28	39.0 10	26.31 28	60.2 14
ly 10.8	46.38 80	44.9 0	54.62 50	50.6 19	58.19 31	40.4 14	26.61 30	58.6 16
20.8	47.19 81	45.6 7	55.14 52	49.0 16	58.51 32	42.0 16	26.93 32	56.8 18
30.7	47.99 80	46.9 13	55.67 53	47.9 11	58.83 32	43.9 19	27.25 32	54.9 19
ne 9.7	48.75 76	48.7 18	56.20 53	47.2 7	59.14 31	46.0 21	27.56 31	52.9 20
19.7	49.46 71	51.0 23	56.71 51	46.9 3	59.45 31	48.3 23	27.87 31	50.9 20
29.6	50.08 62	53.8 28	57.19 48	47.0 1	59.74 29	50.7 24	28.16 29	48.9 20
ly 9.6	50.61 53	56.9 31	57.64 45	47.5 5	60.00 26	53.1 24	28.42 26	47.0 19
19.6	51.04 43	60.3 34	58.03 39	48.5 10	60.23 23	55.4 23	28.66 24	45.2 18
29.6	51.35 31	63.9 36	58.36 33	49.8 13	60.42 19	57.7 23	28.85 19	43.5 17
ig. 8.5	51.54 19	67.7 38	58.62 26	51.5 17	60.56 14	59.8 21	29.01 16	42.1 14
18.5	51.61 7	71.5 38	58.80 18	53.5 20	60.67 11	61.8 20	29.13 12	40.8 13
28.5	51.55 6	75.3 38	58.91 11	55.6 21	60.73 6	63.6 18	29.20 7	39.8 10
pt. 7.5	51.38 17	79.0 37	58.93 2	57.9 23	60.75 2	65.2 16	29.22 2	39.0 8
17.4	51.09 29	82.5 35	58.88 5	60.1 22	60.73 2	66.5 13	29.21 1	38.4 6
27.4	50.69 40	85.7 32	58.77 11	62.3 22	60.67 6	67.6 11	29.17 4	38.0 4
t. 7.4	50.21 48	88.7 30	58.59 18	64.4 21	60.58 9	68.4 8	29.09 8	37.9 1
17.3	49.65 56	91.2 25	58.36 23	66.2 18	60.47 11	68.9 5	28.99 10	37.9 0
27.3	49.02 63	93.3 21	58.10 26	67.7 15	60.35 12	69.2 3	28.87 12	38.0 1
iv. 6.3	48.34 68	94.9 16	57.81 29	68.8 11	60.22 13	69.3 1	28.75 12	38.3 3
16.3	47.63 71	95.9 10	57.52 28	69.4 6	60.08 14	69.1 2	28.62 13	38.7 4
26.2	46.92 71	96.3 4	57.24 29	69.6 2	59.95 13	68.6 5	28.50 12	39.2 5
x. 6.2	46.21 71	96.2 1	56.98 26	69.3 3	59.84 11	68.0 6	28.39 11	39.8 6
16.2	45.54 67	95.4 8	56.75 23	68.5 8	59.73 11	67.1 9	28.30 9	40.5 7
26.2	44.92 62	94.0 14	56.56 19	67.2 13	59.65 8	66.0 11	28.22 8	41.2 7
36.1	44.37 55	92.1 19	56.42 14	65.6 16	59.59 6	64.8 12	28.17 5	42.0 8
δ, Tan δ n Place	3.481 47°.810	+3.334 59''.98	1.843 51°.886	-1.548 68''.91	1.025 56°.871	+0.226 44''.19	1.000 25°.131	-0.013 59''.46
α, D _α α	-0.05	-0.19	+0.02	+0.09	0.00	-0.01	0.00	0.00
β, D _β β	+0.3	-0.5	+0.3	-0.5	+0.3	-0.5	+0.3	-0.5

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	♈ Aquarii Mag. 4.4		♉ Cephei. Mag. 5.4		♊ Gravis. Mag. 2.2		♋ Pegasi. Mag. 4.0	
	Right Ascension.	Declination S.	Right Ascension.	Declination N.	Right Ascension.	Declination S.	Right Ascension.	Declination N.
	h m 22 1	° ' " 14 16	h m 22 2	° ' " +62 22	h m 22 2	° ' " -47 22	h m 22 3	° ' " +24 55
Jan. 1.1	50.69	62.9	23.15	27.1	52.79	37.2	2.56	51.2
11.1	50.66 ³	63.0 ¹	22.88 ²⁷	25.0 ²¹	52.71 ⁸	35.7 ¹⁵	2.50 ⁶	49.5 ¹⁷
21.1	50.65 ¹	63.0 ⁰	22.67 ²¹	22.4 ²⁶	52.67 ⁴	33.9 ¹⁸	2.46 ⁴	47.7 ¹⁸
31.1	50.67 ²	62.9	22.53 ¹⁴	19.6 ²⁸	52.67 ⁰	31.9 ²⁰	2.45 ¹	45.8 ¹⁹
Feb. 10.0	50.72 ⁵	62.6 ³	22.46 ⁷	16.6 ³⁰	52.72 ⁵	29.6 ²³	2.45 ²	44.0 ¹⁸
20.0	50.80	62.1	22.47	13.5	52.82	27.2	2.53	42.2
Mar. 2.0	50.91 ¹¹	61.4 ⁷	22.57 ¹⁰	10.5 ³⁰	52.96 ¹⁴	24.6 ²⁶	2.63 ¹⁰	40.6 ¹⁶
11.9	51.06 ¹⁵	60.5 ⁹	22.75 ¹⁸	7.7 ²⁸	53.15 ¹⁹	22.0 ²⁶	2.76 ¹³	39.2 ¹⁴
21.9	51.23 ¹⁷	59.4 ¹¹	23.01 ²⁶	5.2 ²⁵	53.38 ²³	19.3 ²⁷	2.94 ¹⁸	38.1 ¹¹
31.9	51.44 ²¹	58.2 ¹²	23.35 ³⁴	3.2 ²⁰	53.65 ²⁷	16.7 ²⁶	3.15 ²¹	37.5 ⁶
Apr. 10.9	51.67 ²³	56.7 ¹⁵	23.75 ⁴⁰	1.6 ¹⁶	53.96 ³¹	14.1 ²⁶	3.39 ²⁴	37.2 ³
20.8	51.94 ²⁷	55.1 ¹⁶	24.21 ⁴⁶	0.5 ¹¹	54.31 ³⁵	11.7 ²⁴	3.67 ²⁸	37.4 ²
30.8	52.23 ²⁹	53.4 ¹⁷	24.71 ⁵⁰	0.1 ⁴	54.69 ³⁸	9.4 ²³	3.97 ³⁰	38.0 ⁶
May 10.8	52.54 ³¹	51.6 ¹⁸	25.24 ⁵³	0.3 ²	55.10 ⁴¹	7.4 ²⁰	4.29 ³²	39.1 ¹¹
20.8	52.86 ³²	49.7 ¹⁹	25.79 ⁵⁵	1.0 ⁷	55.52 ⁴²	5.6 ¹⁸	4.62 ³³	40.6 ¹⁵
30.7	53.18 ³²	47.9 ¹⁸	26.33 ⁵⁴	2.4 ¹⁴	55.96 ⁴⁴	4.1 ¹⁵	4.95 ³³	42.4 ¹⁸
June 9.7	53.51 ³³	46.1 ¹⁸	26.86 ⁵³	4.3 ¹⁹	56.39 ⁴³	3.0 ¹¹	5.28 ³³	44.6 ²²
19.7	53.83 ³²	44.4 ¹⁷	27.35 ⁴⁹	6.6 ²³	56.81 ⁴²	2.3 ⁷	5.60 ³²	47.0 ²⁴
29.6	54.13 ³⁰	42.8 ¹⁶	27.80 ⁴⁵	9.4 ²⁸	57.20 ³⁹	1.9 ⁴	5.90 ³⁰	49.6 ²⁶
July 9.6	54.41 ²⁵	41.4 ¹⁴	28.20 ⁴⁰	12.5 ³¹	57.57 ³⁷	2.0 ¹	6.17 ²⁷	52.3 ²⁷
19.6	54.66 ²⁰	40.2 ⁹	28.53 ²⁶	15.9 ³⁶	57.90 ²⁷	2.4 ⁸	6.41 ²⁰	55.1 ²⁷
29.6	54.86 ¹⁷	39.3 ⁷	28.79 ¹⁸	19.5 ³⁷	58.17 ²²	3.2 ¹¹	6.61 ¹⁵	57.8 ²⁷
Aug. 8.5	55.03 ¹³	38.6 ⁵	28.97 ¹⁰	23.2 ³⁷	58.39 ¹⁶	4.3 ¹⁴	6.76 ¹⁵	60.3 ²⁶
18.5	55.16 ⁷	38.1 ²	29.07 ²	26.9 ³⁷	58.55 ⁹	5.7 ¹⁶	6.87 ⁶	63.1 ²⁵
28.5	55.23 ³	37.9 ⁰	29.09 ⁵	30.6 ³⁶	58.64 ³	7.3 ¹⁸	6.93 ²	65.6 ²²
Sept. 7.5	55.26 ¹	37.9 ²	29.04 ¹³	34.2 ³⁴	58.67 ³	9.1 ¹⁹	6.95 ³	67.8 ²⁰
17.4	55.25 ⁴	38.1 ³	28.91 ²⁰	37.6 ³¹	58.64 ⁸	11.0 ¹⁸	6.92 ⁶	69.8 ¹⁷
27.4	55.21 ⁸	38.4 ⁵	28.71 ²⁵	40.7 ²⁸	58.56 ¹⁴	12.8 ¹⁷	6.86 ⁹	71.5 ¹⁴
Oct. 7.4	55.13 ¹¹	38.9 ⁶	28.46 ³⁵	43.5 ¹⁹	58.42 ²⁰	14.5 ¹⁴	6.77 ¹⁴	72.9 ¹¹
17.3	55.02 ¹²	39.4 ⁶	28.16 ³⁰	45.9 ³⁵	58.25 ¹⁷	16.1 ¹⁶	6.65 ¹²	74.0 ⁷
27.3	54.90 ¹³	40.0 ⁶	27.81 ³⁷	47.8 ¹⁵	58.05 ²²	17.5 ¹¹	6.51 ¹⁴	74.7 ⁴
Nov. 6.3	54.77 ¹³	40.6 ⁶	27.44 ³⁹	49.3 ⁹	57.83 ²²	18.6 ⁷	6.37 ¹⁵	75.1 ¹
16.3	54.64 ¹³	41.2 ⁶	27.05 ⁴⁰	50.2 ²	57.60 ²³	19.3 ³	6.22 ¹⁵	75.2 ³
26.2	54.51 ¹¹	41.8 ⁴	26.65 ³⁸	50.6 ⁸	57.38 ²⁰	19.6 ⁵	6.07 ¹²	74.9 ¹¹
Dec. 6.2	54.40 ¹⁰	42.2 ⁴	26.26 ³⁴	50.4 ¹⁸	57.18 ¹¹	19.5 ⁹	5.93 ⁸	74.3 ¹¹
16.2	54.30 ⁷	42.6 ³	25.88 ³⁴	49.6 ¹⁴	57.00 ¹⁴	19.0 ¹²	5.81 ¹¹	73.3 ¹¹
26.2	54.23 ⁶	42.9 ²	25.54 ³⁰	48.2 ¹⁸	56.86 ¹¹	18.1 ¹²	5.70 ⁸	72.0 ¹¹
36.1	54.17	43.1	25.24	46.4	56.75	16.9	5.62	70.5
Sec δ. Tan δ	1.032	-0.255	2.157	+1.911	1.477	-1.086	1.103	+0.405
Mean Place	50°.877	57''.16	25°.475	14''.15	52°.890	24''.06	3°.194	46''.17
D'ψ α, Dω α	0.00	+0.01	-0.02	-0.11	+0.01	+0.06	-0.01	-0.03
Dψ δ, Dω δ	+0.3	-0.5	+0.3	-0.5	+0.3	-0.5	+0.3	-0.5

(Eph 15)

FOR THE UPPER TRANSIT AT WASHINGTON.

n Solar Date.	θ Pegasi. Mag. 3.7		π Pegasi. Mag. 4.4		ζ Cephei. Mag. 3.6		24 Cephei. Mag. 5.0	
	Right Ascension.	Declination N.	Right Ascension.	Declination N.	Right Ascension.	Declination N.	Right Ascension.	Declination N.
	h m 22 5	° ' " + 5 46	h m 22 6	° ' " + 32 45	h m 22 7	° ' " + 57 46	h m 22 8	° ' " + 71 55
	s 54.42	" 45.4	s 11.88	" 45.8	s 52.35	" 67.9	s 6.79	" 34.9
n. 1.1	54.42	45.4	11.88	45.8	52.35	67.9	6.79	34.9
11.1	54.37	44.4	11.80	44.0	52.12	65.8	6.31	32.9
21.1	54.36	43.4	11.74	42.0	51.95	63.4	5.92	30.4
31.1	54.37	42.5	11.72	39.8	51.83	60.6	5.64	27.6
b. 10.0	54.40	41.6	11.73	37.6	51.78	57.7	5.47	24.6
20.0	54.47	40.9	11.78	35.5	51.79	54.7	5.42	21.4
ar. 2.0	54.57	40.3	11.87	33.5	51.88	51.8	5.51	18.3
12.0	54.70	40.0	12.00	31.7	52.04	49.1	5.73	15.3
21.9	54.86	40.0	12.18	30.3	52.27	46.7	6.07	12.6
31.9	55.06	40.2	12.39	29.3	52.56	44.7	6.52	10.3
pr. 10.9	55.29	40.8	12.64	28.6	52.91	43.2	7.08	8.4
20.8	55.55	41.7	12.93	28.5	53.32	42.3	7.72	7.1
30.8	55.83	42.9	13.25	28.9	53.77	41.9	8.43	6.4
ay 10.8	56.13	44.4	13.58	29.8	54.24	42.1	9.17	6.2
20.8	56.44	46.2	13.93	31.1	54.73	42.9	9.94	6.7
30.7	56.76	48.1	14.28	32.8	55.22	44.3	10.70	7.8
ne 9.7	57.08	50.1	14.63	35.0	55.69	46.2	11.43	9.4
19.7	57.39	52.3	14.96	37.4	56.14	48.5	12.12	11.6
29.7	57.68	54.5	15.27	40.1	56.56	51.3	12.74	14.2
ly 9.6	57.94	56.6	15.56	42.9	56.93	54.4	13.29	17.2
19.6	58.18	58.7	15.80	45.9	57.24	57.7	13.74	20.6
29.6	58.38	60.7	16.00	48.9	57.49	61.2	14.08	24.2
ig. 8.5	58.54	62.5	16.16	51.9	57.67	64.9	14.32	27.9
18.5	58.66	64.1	16.27	54.9	57.78	68.5	14.45	31.7
28.5	58.73	65.5	16.33	57.7	57.82	72.1	14.46	35.5
pt. 7.5	58.76	66.7	16.35	60.3	57.80	75.6	14.36	39.2
17.4	58.75	67.7	16.32	62.6	57.71	78.9	14.15	42.8
27.4	58.71	68.4	16.25	64.7	57.56	81.9	13.84	46.1
t. 7.4	58.63	68.9	16.14	66.5	57.35	84.6	13.45	49.2
17.4	58.53	69.2	16.01	67.9	57.11	87.0	12.97	51.9
27.3	58.42	69.3	15.86	69.0	56.83	88.9	12.43	54.1
v. 6.3	58.30	69.2	15.69	69.6	56.52	90.3	11.84	55.9
16.3	58.17	68.9	15.52	69.9	56.20	91.2	11.21	57.1
26.2	58.05	68.4	15.36	69.8	55.87	91.5	10.57	57.8
c. 6.2	57.94	67.7	15.20	69.2	55.54	91.3	9.94	57.9
16.2	57.84	67.0	15.05	68.2	55.24	90.5	9.32	57.3
26.2	57.76	66.1	14.92	66.9	54.95	89.2	8.74	56.1
36.1	57.70	65.2	14.82	65.3	54.70	87.4	8.22	54.4
δ , Tan δ	1.005	+0.101	1.189	+0.644	1.876	+1.587	3.223	+3.064
n Place	54°.752	45°.54	12°.671	38°.64	54°.209	55°.24	10°.570	20°.20
a , $D_{\alpha} a$	0.00	-0.01	-0.01	-0.04	-0.02	-0.09	-0.04	-0.18
b , $D_{\alpha} \delta$	+0.3	-0.5	+0.3	-0.5	+0.4	-0.5	+0.4	-0.5

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	θ Aquarii. Mag. 4.3		α Tucanæ. Mag. 2.9		γ Aquarii. Mag. 4.0		β Pegasi. Mag. 4.9	
	Right Ascension.	Declination S.	Right Ascension.	Declination S.	Right Ascension.	Declination S.	Right Ascension.	Declination N.
	h m	° '	h m	° '	h m	° '	h m	° '
	22 12	— 8 12	22 12	— 60 40	22 17	— 1 48	22 17	+ 11 46
Jan. 1.1	20.78	28.7	41.11	75.9	15.78	59.3	19.70	37.4
11.1	20.74	29.1	40.95	73.9	15.73	59.9	19.65	36.3
21.1	20.72	29.4	40.84	71.5	15.71	60.5	19.62	35.1
31.1	20.73	29.6	40.79	68.8	15.71	61.0	19.61	33.8
Feb. 10.0	20.77	29.6	40.81	65.9	15.74	61.4	19.63	32.6
20.0	20.84	29.5	40.90	62.9	15.80	61.7	19.68	31.6
Mar. 2.0	20.94	29.2	41.05	59.7	15.89	61.8	19.77	30.7
12.0	21.07	28.7	41.26	56.5	16.01	61.6	19.89	30.0
21.9	21.23	27.9	41.54	53.3	16.17	61.2	20.04	29.7
31.9	21.42	26.9	41.87	50.2	16.36	60.6	20.23	29.6
Apr. 10.9	21.65	25.7	42.26	47.3	16.58	59.6	20.45	29.9
20.8	21.90	24.2	42.70	44.6	16.83	58.4	20.70	30.6
30.8	22.18	22.6	43.18	42.1	17.10	57.0	20.98	31.6
May 10.8	22.48	20.9	43.70	40.0	17.40	55.4	21.28	32.9
20.8	22.79	19.0	44.25	38.2	17.71	53.6	21.59	34.5
30.7	23.12	17.1	44.80	36.9	18.03	51.6	21.91	36.4
June 9.7	23.44	15.2	45.36	36.0	18.35	49.6	22.23	38.5
19.7	23.75	13.3	45.91	35.5	18.66	47.6	22.54	40.7
29.7	24.05	11.5	46.43	35.5	18.95	45.6	22.84	43.0
July 9.6	24.33	9.8	46.91	36.0	19.23	43.7	23.12	45.4
19.6	24.58	8.4	47.33	36.9	19.48	41.9	23.36	47.7
29.6	24.79	7.1	47.70	38.2	19.69	40.3	23.57	49.9
Aug. 8.5	24.96	6.0	47.99	39.9	19.86	38.9	23.73	52.1
18.5	25.09	5.1	48.20	41.8	19.99	37.7	23.86	54.0
28.5	25.17	4.5	48.32	44.0	20.08	36.7	23.94	55.8
Sept. 7.5	25.22	4.2	48.36	46.4	20.12	35.9	23.98	57.4
17.4	25.22	4.0	48.31	48.8	20.12	35.4	23.98	58.7
27.4	25.18	4.0	48.18	51.1	20.09	35.1	23.94	59.7
Oct. 7.4	25.11	4.2	47.98	53.2	20.03	34.9	23.87	60.5
17.4	25.02	4.6	47.73	55.2	19.94	35.0	23.78	61.1
27.3	24.90	5.0	47.43	56.8	19.83	35.2	23.67	61.4
Nov. 6.3	24.78	5.5	47.10	57.9	19.72	35.5	23.55	61.5
16.3	24.66	6.0	46.75	58.7	19.60	35.9	23.42	61.4
26.2	24.54	6.5	46.41	58.9	19.48	36.4	23.30	61.0
Dec. 6.2	24.43	7.1	46.09	58.7	19.37	37.0	23.18	60.4
16.2	24.33	7.6	45.79	57.9	19.27	37.7	23.07	59.6
26.2	24.25	8.1	45.54	56.6	19.18	38.3	22.98	58.6
36.1	24.19	8.5	45.33	54.9	19.12	39.0	22.91	57.5
Sec δ , Tan δ	1.010	-0.144	2.042	-1.781	1.000	-0.032	1.022	+0.209
Mean Place	20°.960	24°.85	41°.227	60°.76	15°.987	57°.39	20°.054	35°.35
D' ψ α , D ω α	0.00	+0.01	+0.02	+0.11	0.00	0.00	0.00	-0.01
D ψ δ , D ω δ	+0.4	-0.5	+0.4	-0.5	+0.4	-0.4	+0.4	-0.4

FOR THE UPPER TRANSIT AT WASHINGTON.

an Solar Date.	3 Lacertæ. Mag. 4.6		π Aquarii. Mag. 4.6		σ Aquarii. Mag. 4.9		α Lacertæ. Mag. 3.8	
	Right Ascension.	Declina- tion N.	Right Ascension.	Declina- tion N.	Right Ascension.	Declina- tion S.	Right Ascension.	Declina- tion N.
	h m 22 20	° ' + 51 47	h m 22 20	° ' + 0 56	h m 22 26	° ' - 11 6	h m 22 27	° ' + 49 50
	s "	"	s "	"	s "	"	s "	"
m. 1.2	11.55	82.9	55.95	43.3	8.95	51.9	46.04	55.2
11.1	11.36 ¹⁹	81.0 ¹⁹	55.90 ⁵	42.6 ⁷	8.90 ⁵	52.2 ³	45.86 ¹⁸	53.4 ¹⁸
21.1	11.22 ¹⁴	78.7 ²³	55.87 ³	41.8 ⁸	8.87 ³	52.3 ¹	45.72 ¹⁴	51.1 ²³
31.1	11.12 ¹⁰	76.1 ²⁶	55.87 ⁰	41.2 ⁶	8.86 ¹	52.3 ⁰	45.62 ¹⁰	48.6 ²⁵
h. 10.0	11.07 ⁵	73.3 ²⁸	55.89 ²	40.6 ⁶	8.89 ³	52.2 ¹	45.57 ⁵	45.9 ²⁷
	1	28	6	4	5	3	0	27
20.0	11.08	70.5	55.95	40.2	8.94	51.9	45.57	43.2
ar. 2.0	11.15 ⁷	67.8 ²⁷	56.03 ⁸	39.9 ³	9.02 ⁸	51.4 ⁵	45.63 ⁶	40.6 ²⁶
12.0	11.28 ¹³	65.2 ²⁶	56.15 ¹²	39.9 ⁰	9.14 ¹²	50.6 ⁸	45.75 ¹²	38.1 ²⁵
21.9	11.46 ¹⁸	63.0 ²²	56.30 ¹⁵	40.2 ³	9.29 ¹⁵	49.7 ⁹	45.93 ¹⁸	35.9 ²²
31.9	11.71 ²⁵	61.1 ¹⁹	56.48 ¹⁸	40.7 ⁵	9.47 ¹⁸	48.5 ¹²	46.16 ²³	34.1 ¹⁸
	31	14	22	8	22	14	29	14
or. 10.9	12.02	59.7	56.70	41.5	9.69	47.1	46.45	32.7
20.9	12.37 ³⁵	58.8 ⁹	56.95 ²⁵	42.6 ¹¹	9.94 ²⁵	45.6 ¹⁵	46.78 ³³	31.8 ⁹
30.8	12.75 ³⁸	58.5 ³	57.22 ²⁷	44.0 ¹⁴	10.21 ²⁷	43.8 ¹⁸	47.15 ³⁷	31.4 ⁴
ly 10.8	13.17 ⁴²	58.7 ²	57.51 ²⁹	45.5 ¹⁵	10.51 ³⁰	42.0 ¹⁸	47.55 ⁴⁰	31.6 ²
20.8	13.60 ⁴³	59.5 ⁸	57.82 ³¹	47.3 ¹⁸	10.82 ³¹	40.1 ¹⁹	47.97 ⁴²	32.4 ⁸
	44	13	32	19	32	20	43	13
30.7	14.04	60.8	58.14	49.2	11.14	38.1	48.40	33.7
ne 9.7	14.48 ⁴⁴	62.6 ¹⁸	58.46 ³²	51.2 ²⁰	11.47 ³³	36.2 ¹⁹	48.82 ⁴²	35.5 ¹⁸
19.7	14.89 ⁴¹	64.9 ²³	58.77 ³¹	53.3 ²¹	11.79 ³²	34.3 ¹⁹	49.23 ⁴¹	37.7 ²²
29.7	15.28 ³⁹	67.6 ²⁷	59.07 ³⁰	55.4 ²¹	12.10 ³¹	32.6 ¹⁷	49.61 ³⁸	40.3 ²⁶
ly 9.6	15.63 ³⁵	70.6 ³⁰	59.34 ²⁷	57.4 ²⁰	12.38 ²⁸	31.0 ¹⁶	49.96 ³⁵	43.3 ³⁰
	30	32	25	19	26	14	31	32
19.6	15.93	73.8	59.59	59.3	12.64	29.6	50.27	46.5
29.6	16.18 ²⁵	77.3 ³⁵	59.80 ²¹	61.0 ¹⁷	12.86 ²²	28.4 ¹²	50.52 ²⁵	49.8 ³³
g. 8.6	16.38 ²⁰	80.8 ³⁵	59.98 ¹⁸	62.6 ¹⁶	13.05 ¹⁹	27.4 ¹⁰	50.72 ²⁰	53.3 ³⁵
18.5	16.51 ¹³	84.3 ³⁵	60.11 ¹³	64.0 ¹⁴	13.20 ¹⁵	26.7 ⁷	50.87 ¹⁵	56.8 ³⁵
28.5	16.58 ⁷	87.7 ³⁴	60.20 ⁹	65.2 ¹²	13.30 ¹⁰	26.3 ⁴	50.96 ⁹	60.2 ³⁴
	1	34	5	9	5	2	2	33
ot. 7.5	16.59	91.1	60.25	66.1	13.35	26.1	50.98	63.5
17.4	16.54 ⁵	94.3 ³²	60.26 ¹	66.8 ⁷	13.36 ¹	26.1 ⁰	50.95 ³	66.6 ³¹
27.4	16.44 ¹⁰	97.2 ²⁹	60.23 ³	67.3 ⁵	13.34 ²	26.3 ²	50.87 ⁸	69.5 ²⁹
t. 7.4	16.29 ¹⁵	99.8 ²⁶	60.17 ⁶	67.6 ³	13.28 ⁶	26.6 ³	50.75 ¹²	72.1 ²⁶
17.4	16.11 ¹⁸	102.0 ²²	60.08 ⁹	67.7 ¹	13.19 ⁹	27.1 ⁵	50.58 ¹⁷	74.3 ²²
	22	18	10	1	10	5	20	18
27.3	15.89	103.8	59.98	67.6	13.09	27.6	50.38	76.1
v. 6.3	15.65 ²⁴	105.2 ¹⁴	59.86 ¹²	67.3 ³	12.97 ¹²	28.2 ⁶	50.16 ²²	77.6 ¹⁵
16.3	15.39 ²⁶	106.1 ⁹	59.74 ¹²	66.9 ⁴	12.85 ¹²	28.8 ⁶	49.93 ²³	78.5 ⁹
26.3	15.13 ²⁶	106.4 ³	59.62 ¹²	66.4 ⁵	12.73 ¹²	29.4 ⁶	49.68 ²⁵	78.9 ⁴
c. 6.2	14.87 ²⁶	106.3 ¹	59.51 ¹¹	65.8 ⁶	12.61 ¹²	30.0 ⁶	49.44 ²⁴	78.7 ²
	25	7	10	6	10	5	23	6
16.2	14.62	105.6	59.41	65.2	12.51	30.5	49.21	78.1
26.2	14.39 ²³	104.3 ¹³	59.32 ⁹	64.4 ⁸	12.42 ⁹	30.9 ⁴	48.99 ²²	76.9 ¹²
36.1	14.19 ²⁰	102.6 ¹⁷	59.26 ⁶	63.7 ⁷	12.36 ⁶	31.3 ⁴	48.80 ¹⁹	75.4 ¹⁵
l, Tan δ	1.617	+1.271	1.000	+0.017	1.019	-0.196	1.551	+1.185
1 Place	12°.924	70''.39	56°.163	44''.29	9°.036	47''.60	47°.263	42''.51
l, D ₀ α	-0.01	-0.08	0.00	0.00	0.00	+0.01	-0.01	-0.07
l, D ₀ δ	+0.4	-0.4	+0.4	-0.4	+0.4	-0.4	+0.4	-0.4

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	U Aquarii. Mag. 5.3		226 B. Cephei. Mag. 5.7		77 Aquarii. Mag. 4.1		10 Lacertæ. Mag. 4.9	
	Right Ascension.	Declination S.	Right Ascension.	Declination N.	Right Ascension.	Declination S.	Right Ascension.	Declination N.
	h m	° '	h m	° '	h m	° '	h m	° '
	22 30	- 21 8	22 30	+ 75 47	22 30	- 0 32	22 35	+ 38 36
	s	"	s	"	s	"	s	"
Jan. 1.2	2.73 6	45.9 2	42.59 68	35.0 17	59.19 6	82.3 7	25.96 12	37.6 16
11.1	2.67 3	45.7 3	41.91 58	33.3 22	59.13 3	83.0 7	25.84 10	36.0 20
21.1	2.64 3	45.4 5	41.33 46	31.1 26	59.10 1	83.7 5	25.74 7	34.0 22
31.1	2.63 1	44.9 8	40.87 31	28.5 29	59.09 1	84.2 5	25.67 3	31.8 23
Feb. 10.0	2.65 2	44.1 10	40.56 16	25.6 31	59.10 5	84.7 3	25.64 1	29.5 23
20.0	2.70 8	43.1 11	40.40 0	22.5 32	59.15 7	85.0 2	25.65 6	27.2 22
Mar. 2.0	2.78 12	42.0 13	40.40 17	19.3 31	59.22 11	85.2 1	25.71 10	25.0 21
12.0	2.90 15	40.7 15	40.57 34	16.2 28	59.33 14	85.1 4	25.81 15	22.9 18
21.9	3.05 19	39.2 17	40.91 49	13.4 26	59.47 18	84.7 6	25.96 20	21.1 14
31.9	3.24 22	37.5 19	41.40 62	10.8 21	59.65 20	84.1 8	26.16 24	19.7 10
Apr. 10.9	3.46 25	35.6 19	42.02 74	8.7 17	59.85 24	83.3 12	26.40 28	18.7 5
20.9	3.71 28	33.7 20	42.76 83	7.0 10	60.09 27	82.1 14	26.68 31	18.2 0
30.8	3.99 31	31.7 20	43.59 90	6.0 5	60.36 29	80.7 16	26.99 35	18.6 4
May 10.8	4.30 32	29.7 21	44.49 94	5.5 1	60.65 31	79.1 18	27.34 36	18.6 10
20.8	4.62 34	27.6 19	45.43 95	5.6 7	60.96 32	77.3 19	27.70 37	19.6 14
30.7	4.96 34	25.7 18	46.38 93	6.3 13	61.28 32	75.4 20	28.07 37	21.0 19
June 9.7	5.30 33	23.9 17	47.31 88	7.6 18	61.60 31	73.4 21	28.44 37	22.9 23
19.7	5.63 33	22.2 15	48.19 81	9.4 23	61.91 28	71.3 20	28.81 34	25.2 25
29.7	5.96 30	20.7 12	49.00 72	11.7 28	62.22 25	69.3 19	29.15 28	27.7 30
July 9.6	6.26 27	19.5 10	49.72 62	14.5 31	62.50 25	67.3 19	29.47 28	30.5 30
19.6	6.53 24	18.5 7	50.34 50	17.6 34	62.75 22	65.4 17	29.75 24	33.5 31
29.6	6.77 20	17.8 4	50.84 37	21.0 37	62.97 19	63.7 15	29.99 20	36.6 32
Aug. 8.6	6.97 15	17.4 1	51.21 33	24.7 37	63.16 14	62.2 13	30.19 15	39.8 31
18.5	7.12 11	17.3 1	51.44 9	28.4 39	63.30 10	60.9 11	30.34 9	42.9 31
28.5	7.23 6	17.4 4	51.53 5	32.3 38	63.40 6	59.8 8	30.43 5	46.0 29
Sept. 7.5	7.29 2	17.8 6	51.48 18	36.1 38	63.46 2	59.0 6	30.48 0	48.9 27
17.4	7.31 3	18.4 7	51.30 31	39.9 35	63.48 3	58.4 4	30.48 5	51.6 25
27.4	7.28 6	19.1 9	50.99 43	43.4 33	63.45 5	58.0 3	30.43 8	54.1 21
Oct. 7.4	7.22 11	20.0 9	50.56 53	46.7 26	63.40 10	57.7 2	30.35 14	56.2 15
17.4	7.13 11	20.9 9	50.03 63	49.7 26	63.33 10	57.7 2	30.24 14	58.1 15
27.3	7.02 12	21.8 9	49.40 71	52.3 21	63.23 11	57.9 3	30.10 17	59.6 11
Nov. 6.3	6.90 13	22.7 8	48.69 77	54.4 17	63.12 12	58.2 4	29.93 17	60.7 6
16.3	6.77 13	23.5 6	47.92 81	56.1 11	63.00 11	58.6 5	29.76 17	61.3 2
26.3	6.64 13	24.1 5	47.11 82	57.2 4	62.88 11	59.1 6	29.58 18	61.5 2
Dec. 6.2	6.51 11	24.6 4	46.29 82	57.6 2	62.77 10	59.7 7	29.40 17	61.3 7
16.2	6.40 10	25.0 1	45.47 79	57.4 8	62.67 9	60.4 6	29.23 16	60.6 10
26.2	6.30 7	25.1 0	44.68 72	56.6 13	62.58 7	61.0 7	29.07 14	59.6 15
36.1	6.23 7	25.1 0	43.96 72	55.3 13	62.51 7	61.7 7	28.93 14	58.1 15
Sec δ, Tan δ	1.672	-0.387	4.074	+3.950	1.000	-0.010	1.280	+0.799
Mean Place	2 ^h .730	38 ^m .83	47 ^h .103	17 ^m .92	59 ^h .337	81 ^m .30	26 ^h .725	27 ^m .07
D _ψ α, D _ω α	0.00	+0.02	-0.04	-0.24	0.00	0.00	-0.01	-0.05
D _ψ δ, D _ω δ	+0.4	-0.4	+0.4	-0.4	+0.4	-0.4	+0.4	-0.4

FOR THE UPPER TRANSIT AT WASHINGTON.

in Solar Date.	ϵ Piscis Australis. Mag. 4.2		ζ Pegasi. Mag. 3.6		β Octantis. Mag. 4.3		β Gruis. Mag. 2.2	
	Right Ascension.	Declination S.	Right Ascension.	Declination N.	Right Ascension.	Declination S.	Right Ascension.	Declination S.
	h m 22 35	° ' -27 28	h m 22 37	° ' +10 23	h m 22 37	° ' -81 49	h m 22 37	° ' -47 19
	s "	"	s "	"	s "	"	s "	"
n. 1.2	57.47	83.5	13.11	16.8	25.91	56.7	35.99	59.6
11.1	57.40 7	83.1 4	13.04 7	15.7 11	24.93 98	54.2 25	35.87 12	58.3 13
21.1	57.35 5	82.5 6	13.00 4	14.6 11	24.15 78	51.3 29	35.79 8	56.7 16
31.1	57.34 1	81.6 9	12.98 2	13.5 11	23.59 56	48.0 33	35.74 5	54.8 19
b. 10.1	57.35 1	80.5 11	12.98 0	12.4 11	23.26 33	44.4 36	35.74 0	52.6 22
	4	14	3	9	8	38	4	25
20.0	57.39 8	79.1 15	13.01 7	11.5 8	23.18 15	40.6 38	35.78 8	50.1 26
11.2	57.47 11	77.6 17	13.08 10	10.7 5	23.33 39	36.8 38	35.86 13	47.5 27
12.0	57.58 15	75.9 19	13.18 13	10.2 3	23.72 61	33.0 38	35.99 18	44.8 29
21.9	57.73 19	74.0 20	13.31 17	9.9 0	24.33 82	29.2 36	36.17 22	41.9 28
31.9	57.92 22	72.0 21	13.48 21	9.9 3	25.15 102	25.6 33	36.39 27	39.1 28
11.0	58.14 26	69.9 22	13.69 23	10.2 7	26.17 119	22.3 30	36.66 31	36.3 28
20.9	58.40 29	67.7 22	13.92 27	10.9 10	27.36 134	19.3 27	36.97 35	33.5 26
30.8	58.69 31	65.5 22	14.19 29	11.9 13	28.70 147	16.6 23	37.32 38	30.9 24
ay 10.8	59.00 33	63.3 21	14.48 31	13.2 16	30.17 156	14.3 18	37.70 40	28.5 21
20.8	59.33 35	61.2 20	14.79 32	14.8 19	31.73 161	12.5 12	38.10 42	26.4 18
30.8	59.68 35	59.2 18	15.11 32	16.7 20	33.34 164	11.3 8	38.52 43	24.6 15
ne 9.7	60.03 35	57.4 16	15.43 32	18.7 22	34.98 162	10.5 2	38.95 43	23.1 12
19.7	60.38 33	55.8 13	15.75 31	20.9 22	36.60 156	10.3 3	39.38 41	21.9 7
29.7	60.71 32	54.5 10	16.06 28	23.1 23	38.16 146	10.6 9	39.79 39	21.2 3
ly 9.6	61.03 29	53.5 7	16.34 26	25.4 23	39.62 131	11.5 13	40.18 36	20.9 1
19.6	61.32 25	52.8 4	16.60 22	27.7 22	40.93 113	12.8 18	40.54 30	21.0 6
29.6	61.57 21	52.4 1	16.82 19	29.9 20	42.06 92	14.6 23	40.84 26	21.6 9
ig. 8.6	61.78 17	52.3 2	17.01 15	31.9 17	42.98 67	16.9 25	41.10 20	22.5 13
18.5	61.95 12	52.5 5	17.16 10	33.8 15	43.65 41	19.4 27	41.30 14	23.8 15
28.5	62.07 7	53.0 7	17.26 6	35.5 15	44.06 12	22.1 29	41.44 8	25.3 18
pt. 7.5	62.14 2	53.7 10	17.32 2	37.0 13	44.18 17	25.0 30	41.52 1	27.1 19
17.5	62.16 3	54.7 11	17.34 2	38.3 10	44.01 44	28.0 28	41.53 4	29.0 20
27.4	62.13 6	55.8 11	17.32 5	39.3 8	43.57 70	30.8 26	41.49 10	31.0 20
t. 7.4	62.07 9	56.9 12	17.27 7	40.1 6	42.87 94	33.4 23	41.39 14	33.0 18
17.4	61.98 12	58.1 11	17.20 10	40.7 3	41.93 113	35.7 19	41.25 17	34.8 17
27.3	61.86 13	59.2 11	17.10 11	41.0 0	40.80 129	37.6 14	41.08 20	36.5 14
iv. 6.3	61.73 14	60.3 9	16.99 12	41.0 1	39.51 139	39.0 8	40.88 22	37.9 10
16.3	61.59 15	61.2 7	16.87 12	40.9 3	38.12 143	39.8 2	40.66 22	38.9 7
26.3	61.44 14	61.9 5	16.75 11	40.6 6	36.69 136	40.0 10	40.44 20	39.6 2
x. 6.2	61.30 12	62.4 2	16.64 11	40.0 7	35.26 136	39.6 4	40.23 20	39.8 1
16.2	61.18 11	62.6 0	16.53 10	39.3 9	33.90 126	38.6 17	40.03 17	39.7 6
26.2	61.07 9	62.6 2	16.43 7	38.4 10	32.64 110	36.9 22	39.86 15	39.1 10
36.2	60.98 9	62.4 2	16.36 7	37.4 10	31.54 110	34.7 22	39.71 15	38.1 10
δ , Tan δ	1.127	-0.520	1.017	+0.183	7.033	-6.962	1.475	-1.085
n Place	57°.401	74°'.91	13°.343	14°'.19	26°.383	39°'.87	35°.848	46°'.45
a, D_{α} a	0.00	+0.03	0.00	-0.01	+0.07	+0.44	+0.01	+0.07
b, D_{α} δ	+0.4	-0.4	+0.4	-0.4	+0.4	-0.4	+0.4	-0.4

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	γ Pegasi. Mag. 3.1		λ Pegasi. Mag. 4.1		ϵ Gravis. Mag. 3.7		τ Aquarii. Mag. 4.2	
	Right Ascension.	Declination N.	Right Ascension.	Declination N.	Right Ascension.	Declination S.	Right Ascension.	Declination S.
	h m	° '	h m	° '	h m	° '	h m	° '
	22 39	+29 46	22 42	+23 6	22 43	-51 45	22 45	-14 2
	s	"	s	"	s	"	s	"
Jan. 1.2	0.42	42.9	25.72	71.6	25.75	64.5	5.63	34.0
11.1	0.32 ¹⁰	41.4 ¹⁵	25.64 ⁸	70.3 ¹³	25.60 ¹⁵	63.1 ¹⁴	5.57 ⁶	34.2 ⁸
21.1	0.24 ⁸	39.7 ¹⁷	25.57 ⁷	68.8 ¹⁵	25.50 ¹⁰	61.3 ¹⁸	5.52 ⁵	34.2 ⁰
31.1	0.19 ⁵	37.8 ¹⁹	25.53 ⁴	67.1 ¹⁷	25.43 ⁷	59.1 ²²	5.50 ²	34.0 ²
Feb. 10.1	0.17 ²	35.8 ²⁰	25.52 ¹	65.5 ¹⁶	25.41 ²	56.7 ²⁴	5.51 ¹	33.7 ³
		19		16		26		5
20.0	0.19	33.9	25.54	63.9	25.43	54.1	5.54	33.2
Mar. 2.0	0.25 ⁶	32.0 ¹⁹	25.59 ⁵	62.4 ¹⁵	25.51 ⁸	51.3 ²⁸	5.60 ⁶	32.5 ⁷
12.0	0.34 ⁹	30.4 ¹⁶	25.69 ¹⁰	61.1 ¹³	25.64 ¹³	48.3 ³⁰	5.70 ¹⁰	31.5 ¹⁰
21.9	0.48 ¹⁴	29.1 ¹³	25.82 ¹³	60.1 ¹⁰	25.81 ¹⁷	45.3 ³⁰	5.83 ¹³	30.4 ¹¹
31.9	0.66 ¹⁸	28.0 ¹¹	25.99 ¹⁷	59.4 ⁷	26.04 ²³	42.2 ³¹	6.00 ¹⁷	29.1 ¹³
		6		3		29		16
Apr. 10.9	0.88	27.4	26.20	59.1	26.32	39.3	6.20	27.5
20.9	1.14 ²⁶	27.2 ²	26.44 ²⁴	59.2 ¹	26.64 ³²	36.4 ²⁹	6.43 ²³	25.8 ¹⁷
30.8	1.43 ²⁹	27.5 ³	26.72 ²⁸	59.7 ⁵	27.01 ³⁷	33.7 ²⁷	6.69 ²⁶	23.9 ¹⁹
May 10.8	1.75 ³²	28.2 ⁷	27.02 ³⁰	60.6 ⁹	27.41 ⁴⁰	31.2 ²⁵	6.98 ²⁹	22.0 ¹⁹
20.8	2.09 ³⁴	29.4 ¹²	27.34 ³²	61.9 ¹³	27.84 ⁴³	29.0 ²²	7.29 ³¹	20.0 ²⁰
		16		16		18		21
30.8	2.43	31.0	27.68	63.5	28.29	27.2	7.62	17.9
June 9.7	2.78 ³⁵	32.9 ¹⁹	28.02 ³⁴	65.5 ²⁰	28.75 ⁴⁶	25.7 ¹⁵	7.95 ³³	15.9 ²⁰
19.7	3.12 ³⁴	35.1 ²²	28.35 ³³	67.7 ²²	29.21 ⁴⁶	24.6 ¹¹	8.27 ³²	14.0 ¹⁹
29.7	3.45 ³³	37.6 ²⁵	28.66 ³¹	70.2 ²⁵	29.65 ⁴⁴	24.0 ⁶	8.59 ³²	12.3 ¹⁷
July 9.6	3.75 ³⁰	40.3 ²⁷	28.96 ³⁰	72.7 ²⁵	30.07 ⁴²	23.8 ²	8.89 ³⁰	10.7 ¹⁶
		28		27		3		13
19.6	4.02	43.1	29.23	75.4	30.45	24.1	9.17	9.4
Aug. 29.6	4.26 ²⁴	46.0 ²⁹	29.46 ²³	78.0 ²⁶	30.79 ³⁴	24.8 ⁷	9.41 ²⁴	8.3 ¹¹
8.6	4.45 ¹⁹	48.9 ²⁹	29.65 ¹⁹	80.6 ²⁶	31.08 ²⁹	25.9 ¹¹	9.61 ²⁰	7.4 ⁹
18.5	4.60 ¹⁵	51.7 ²⁸	29.80 ¹⁵	83.2 ²⁶	31.30 ²²	27.3 ¹⁴	9.77 ¹⁶	6.9 ⁵
28.5	4.70 ¹⁰	54.4 ²⁷	29.91 ¹¹	85.6 ²⁴	31.45 ¹⁵	29.0 ¹⁷	9.89 ¹²	6.6 ³
		5		21		20		1
Sept. 7.5	4.75	56.9	29.97	87.7	31.54	31.0	9.96	6.5
17.5	4.77 ²	59.2 ²³	29.99 ²	89.7 ²⁰	31.56 ²	33.1 ²¹	10.00 ⁴	6.7 ²
27.4	4.74 ³	61.2 ²⁰	29.97 ²	91.4 ¹⁷	31.51 ⁵	35.3 ²²	9.99 ¹	7.1 ⁴
Oct. 7.4	4.67 ⁷	63.0 ¹⁸	29.92 ⁵	92.9 ¹⁵	31.41 ¹⁰	37.5 ²²	9.94 ⁵	7.6 ⁵
17.4	4.58 ⁹	64.5 ¹⁵	29.84 ⁸	94.1 ¹²	31.25 ¹⁶	39.5 ²⁰	9.87 ⁷	8.2 ⁶
		11		8		17		7
27.3	4.46	65.6	29.74	94.9	31.05	41.2	9.78	8.9
Nov. 6.3	4.33 ¹³	66.4 ⁸	29.62 ¹²	95.5 ⁶	30.83 ²²	42.7 ¹⁵	9.67 ¹¹	9.7 ⁸
16.3	4.19 ¹⁴	66.8 ⁴	29.49 ¹³	95.7 ²	30.59 ²⁴	43.9 ¹²	9.55 ¹²	10.4 ⁷
26.3	4.04 ¹⁵	66.9 ¹	29.35 ¹⁴	95.7 ⁰	30.34 ²⁵	44.6 ⁷	9.43 ¹²	11.1 ⁷
Dec. 6.2	3.89 ¹⁵	66.6 ³	29.22 ¹³	95.3 ⁴	30.10 ²⁴	44.8 ²	9.31 ¹²	11.7 ⁶
		7		7		2		5
16.2	3.75	65.9	29.09	94.6	29.87	44.6	9.20	12.2
26.2	3.62 ¹³	64.8 ¹¹	28.98 ¹¹	93.6 ¹⁰	29.66 ²¹	43.9 ⁷	9.11 ⁹	12.6 ⁴
36.2	3.51 ¹¹	63.5 ¹³	28.88 ¹⁰	92.4 ¹²	29.49 ¹⁷	42.8 ¹¹	9.03 ⁸	12.8 ²
Sec δ , Tan δ	1.152	+0.572	1.087	+0.427	1.616	-1.269	1.031	-0.250
Mean Place	0°.947	34''.51	26°.109	64''.97	25°.560	50''.53	5°.599	29''.33
$D^* \alpha$, $D_* \alpha$	-0.01	-0.04	0.00	-0.03	+0.01	+0.08	0.00	+0.02
$D^* \delta$, $D_* \delta$	+0.4	-0.3	+0.4	-0.3	+0.4	-0.3	+0.4	-0.3

FOR THE UPPER TRANSIT AT WASHINGTON.

an Solar Date.	μ Pegasi. Mag. 3.7		ϵ Cephei. Mag. 3.7		λ Aquarii. Mag. 3.8		ρ Indi. Mag. 6.1	
	Right Ascension.	Declina- tion N.	Right Ascension.	Declina- tion N.	Right Ascension.	Declina- tion S.	Right Ascension.	Declina- tion S.
	h m 22 45	° ' + 24 9	h m 22 46	° ' + 65 45	h m 22 48	° ' - 8 1	h m 22 48	° ' - 70 31
	s 53.58	" 16.1	s 36.86	" 28.2	s 10.85	" 58.7	s 45.73	" 57.7
un. 1.2	53.49 9	14.7 14	36.49 37	26.6 16	10.79 6	59.1 4	45.35 38	55.6 21
11.1	53.42 7	13.2 15	36.17 32	24.5 21	10.74 5	59.4 3	45.05 30	53.1 25
21.1	53.37 5	11.5 17	35.91 26	22.0 25	10.72 2	59.6 2	44.83 22	50.2 29
31.1	53.36 1	9.8 17	35.73 18	19.2 28	10.72 0	59.6 0	44.71 12	47.1 31
sb. 10.1	53.36 1	16	35.73 9	30	10.72 3	59.6 2	44.71 3	47.1 34
20.0	53.37 5	8.2 16	35.64 0	16.2 30	10.75 6	59.4 4	44.68 6	43.7 36
ar. 2.0	53.42 9	6.6 13	35.64 10	13.2 29	10.81 9	59.0 5	44.74 17	40.1 37
12.0	53.51 17	5.3 11	35.74 19	10.3 28	10.90 13	58.5 10	44.91 26	36.4 36
22.0	53.64 13	4.2 7	35.93 29	7.5 25	11.03 16	57.7 10	45.17 35	32.8 35
31.9	53.81 21	3.5 4	36.22 37	5.0 20	11.19 19	56.7 13	45.52 44	29.3 34
or. 10.9	54.02 24	3.1 0	36.59 45	3.0 15	11.38 23	55.4 15	45.96 52	25.9 31
20.9	54.26 28	3.1 5	37.04 52	1.5 10	11.61 26	53.9 17	46.48 59	22.8 29
30.8	54.54 30	3.6 8	37.56 56	0.5 5	11.87 28	52.2 18	47.07 66	19.9 25
ay 10.8	54.84 32	4.4 13	38.12 60	0.0 1	12.15 31	50.4 19	47.73 71	17.4 21
20.8	55.16 34	5.7 16	38.72 61	0.1 8	12.46 32	48.5 20	48.44 74	15.3 17
30.8	55.50 34	7.3 19	39.33 61	0.9 13	12.78 32	46.5 20	49.18 75	13.6 12
ne 9.7	55.84 33	9.2 23	39.94 59	2.2 18	13.10 32	44.5 20	49.93 75	12.4 6
19.7	56.17 32	11.5 24	40.53 56	4.0 23	13.42 31	42.5 19	50.68 74	11.8 1
29.7	56.49 27	13.9 25	41.09 44	6.3 31	13.73 27	40.6 16	51.42 63	11.7 9
ly 9.7	56.79 24	16.4 27	41.60 38	9.0 33	14.03 24	38.8 14	52.11 56	12.1 13
19.6	57.06 20	19.1 26	42.04 30	12.1 36	14.30 20	37.2 12	52.74 47	13.0 18
29.6	57.30 15	21.8 24	42.42 21	15.4 22	14.54 16	35.8 9	53.30 36	14.3 22
ig. 8.6	57.50 11	24.4 24	42.72 13	19.0 38	14.74 12	34.6 6	53.77 24	16.1 24
18.5	57.65 7	27.0 23	42.93 5	22.7 37	14.90 8	33.7 4	54.13 12	18.3 27
28.5	57.76 2	29.4 20	43.06 4	26.5 36	15.02 3	33.1 2	54.37 0	20.7 27
pt. 7.5	57.83 1	31.7 18	43.11 12	30.2 35	15.10 0	32.7 0	54.49 13	23.4 27
17.5	57.85 5	33.7 15	43.07 19	33.8 32	15.13 7	32.5 3	54.49 34	26.1 23
27.4	57.84 8	35.5 10	42.95 26	37.3 25	15.13 9	32.5 5	54.36 42	28.8 21
t. 7.4	57.79 10	37.0 10	42.76 31	40.5 29	15.09 9	32.7 5	54.13 42	31.5 21
17.4	57.71 12	38.2 6	42.50 36	43.4 21	15.02 10	33.0 6	53.79 49	33.8 16
27.4	57.61 13	39.2 3	42.19 40	45.9 15	14.93 11	33.5 6	53.37 53	35.9 11
v. 6.3	57.49 14	39.8 1	41.83 43	48.0 10	14.83 12	34.1 6	52.88 55	37.5 5
16.3	57.36 13	40.1 7	41.43 44	49.5 2	14.72 11	34.7 6	52.35 53	38.6 6
26.3	57.22 13	40.0 7	41.00 44	50.5 2	14.60 11	35.3 6	51.80 53	39.1 5
c. 6.2	57.09 13	39.7 7	40.56 44	51.0 2	14.49 11	35.9 6	51.25 53	39.1 5
16.2	56.96 11	39.0 10	40.12 42	50.8 7	14.38 9	36.5 5	50.72 48	38.5 12
26.2	56.85 11	38.0 12	39.70 39	50.1 13	14.29 8	37.0 5	50.24 43	37.3 17
36.2	56.74 11	36.8 12	39.31 39	48.8 13	14.21 8	37.5 5	49.81 43	35.6 17
δ , Tan δ	1.096	+0.448	2.435	+2.221	1.010	-0.141	3.000	-2.828
n Place	53°.962	8''.89	39°.052	11''.17	10°.851	55''.91	45°.522	41''.31
α , D_α α	0.00	-0.03	-0.02	-0.14	0.00	+0.01	+0.02	+0.18
δ , D_δ δ	+0.4	-0.3	+0.4	-0.3	+0.4	-0.3	+0.4	-0.3

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	δ Aquarii. Mag. 3.5		α Piscis Australis. (Fomalhaut). Mag. 1.3		\circ Andromedæ. Mag. 3.6		β Pegasi. Var. 2.2-2.7	
	Right Ascension.	Declination S.	Right Ascension.	Declination S.	Right Ascension.	Declination N.	Right Ascension.	Declination N.
	h m	° '	h m	° '	h m	° '	h m	° '
	22 50	-16 16	22 52	-30 3	22 57	+41 52	22 59	+27 37
	"	"	"	"	"	"	"	"
Jan. 1.2	8.51	28.5	57.59	92.1	59.71	20.9	38.74	26.2
11.1	8.44	28.6	57.50	91.6	59.56	19.4	38.63	24.9
21.1	8.39	28.5	57.44	90.9	59.43	17.5	38.55	23.3
31.1	8.37	28.3	57.40	89.9	59.33	15.4	38.49	21.6
Feb. 10.1	8.37	27.8	57.39	88.7	59.27	13.1	38.45	19.9
	"	"	"	"	"	"	"	"
20.0	8.39	27.2	57.42	87.2	59.25	10.8	38.45	18.1
Mar. 2.0	8.45	26.3	57.48	85.5	59.28	8.5	38.48	16.4
12.0	8.55	25.2	57.57	83.6	59.35	6.3	38.56	14.9
22.0	8.67	23.9	57.70	81.6	59.47	4.3	38.67	13.6
31.9	8.83	22.4	57.87	79.4	59.65	2.7	38.83	12.6
	"	"	"	"	"	"	"	"
Apr. 10.9	9.03	20.8	58.08	77.1	59.88	1.4	39.03	12.0
20.9	9.26	19.0	58.33	74.8	60.15	0.6	39.27	11.8
30.8	9.52	17.0	58.61	72.4	60.46	0.3	39.54	12.1
May 10.8	9.81	15.0	58.91	70.1	60.81	0.4	39.84	12.8
20.8	10.12	12.9	59.24	67.9	61.18	1.1	40.17	13.9
	"	"	"	"	"	"	"	"
30.8	10.45	10.9	59.59	65.8	61.56	2.3	40.51	15.3
June 9.7	10.78	8.9	59.95	63.9	61.95	3.9	40.86	17.2
19.7	11.11	7.0	60.31	62.3	62.34	6.0	41.20	19.3
29.7	11.43	5.3	60.66	60.9	62.71	8.4	41.54	21.7
July 9.7	11.73	3.8	60.99	59.9	63.05	11.1	41.85	24.2
	"	"	"	"	"	"	"	"
19.6	12.01	2.5	61.29	59.2	63.36	14.0	42.14	26.9
29.6	12.26	1.5	61.56	58.8	63.64	17.1	42.39	29.7
Aug. 8.6	12.47	0.8	61.79	58.8	63.86	20.2	42.60	32.4
18.5	12.64	0.3	61.98	59.1	64.04	23.4	42.77	35.1
28.5	12.76	0.1	62.12	59.7	64.17	26.6	42.90	37.7
	"	"	"	"	"	"	"	"
Sept. 7.5	12.84	0.2	62.20	60.6	64.25	29.7	42.98	40.2
17.5	12.88	0.5	62.24	61.7	64.28	32.6	43.02	42.4
27.4	12.87	1.0	62.24	62.9	64.26	35.3	43.01	44.4
Oct. 7.4	12.84	1.7	62.19	64.2	64.20	37.7	42.98	46.1
17.4	12.77	2.4	62.11	65.6	64.10	39.8	42.91	47.6
	"	"	"	"	"	"	"	"
27.4	12.67	3.2	62.00	66.9	63.97	41.6	42.81	48.8
Nov. 6.3	12.56	4.0	61.87	68.1	63.82	42.9	42.70	49.6
16.3	12.44	4.8	61.73	69.2	63.65	43.9	42.57	50.1
26.3	12.32	5.5	61.58	70.0	63.47	44.4	42.44	50.2
Dec. 6.2	12.20	6.2	61.44	70.6	63.28	44.4	42.30	50.0
	"	"	"	"	"	"	"	"
16.2	12.09	6.7	61.31	70.9	63.10	44.0	42.16	49.4
26.2	11.99	7.0	61.19	70.9	62.92	43.2	42.04	48.6
36.2	11.91	7.2	61.08	70.7	62.76	41.9	41.92	47.4
	"	"	"	"	"	"	"	"
Sec δ , Tan δ	1.042	-0.292	1.156	-0.579	1.343	+0.896	1.129	+0.523
Mean Place	8°.435	23'".30	57°.408	83'".03	60°.406	8'".08	39°.097	17'".25
$D'\psi a, D_\omega a$	0.00	+0.02	0.00	+0.04	-0.01	-0.06	0.00	-0.03
$D\psi \delta, D_\omega \delta$	+0.4	-0.3	+0.4	-0.3	+0.4	-0.3	+0.4	-0.3

FOR THE UPPER TRANSIT AT WASHINGTON.

an Solar Date.	α Pegasi. (Markab.) Mag. 2.6		δ Pegasi. Mag. 4.7		ϵ Aquarii. Mag. 3.8		π Cephei. Mag. 4.6	
	Right Ascension.	Declina- tion N.	Right Ascension.	Declina- tion N.	Right Ascension.	Declina- tion S.	Right Ascension.	Declina- tion N.
	h m 23 0	° ' " +14 44	h m 23 2	° ' " + 8 56	h m 23 4	° ' " -21 37	h m 23 5	° ' " +74 55
n. 1.2	31.37	56.7	43.22	63.3	55.16	69.1	7.95	59.7
11.2	31.28 9	55.6 11	43.14 8	62.4 9	55.08 8	69.1 0	7.27 68	58.4 13
21.1	31.22 6	54.5 11	43.08 6	61.4 10	55.02 6	68.8 3	6.66 61	56.6 18
31.1	31.17 5	53.2 13	43.04 4	60.5 9	54.98 4	68.3 5	6.15 51	54.3 23
b. 10.1	31.15 2	52.0 12	43.02 2	59.5 10	54.96 2	67.5 8	5.75 40	51.7 26
	31.15 1	52.0 11	43.02 1	59.5 8	54.96 1	67.5 10	5.75 26	51.7 29
20.0	31.16	50.9	43.03	58.7	54.97	66.5	5.49	48.8
ur. 2.0	31.20 4	49.9 10	43.07 4	58.1 6	55.02 5	65.3 12	5.38 11	45.7 31
12.0	31.28 8	49.9 8	43.07 7	58.1 6	55.02 5	65.3 14	5.38 5	45.7 31
22.0	31.28 11	49.1 6	43.14 11	57.6 5	55.09 7	63.9 16	5.43 20	42.6 30
31.9	31.39 15	48.5 2	43.25 15	57.4 0	55.21 15	62.3 18	5.63 36	39.6 27
	31.54 18	48.3 0	43.40 18	57.4 4	55.36 18	60.5 19	5.99 50	36.9 24
ur. 10.9	31.72	48.3	43.58	57.8	55.54	58.6	6.49	34.5
20.9	31.95 23	48.7 4	43.80 22	58.5 7	55.76 22	56.5 21	7.11 62	32.5 20
30.9	32.21 26	49.5 8	44.05 25	59.5 10	56.02 26	54.3 22	7.85 74	31.1 14
ly 10.8	32.49 28	50.6 11	44.33 28	60.8 13	56.31 29	52.1 22	8.67 82	30.2 9
20.8	32.79 30	52.0 14	44.63 30	62.4 16	56.62 31	49.9 22	9.54 87	29.9 3
	32.79 32	52.0 18	44.63 31	62.4 18	56.62 32	49.9 21	9.54 90	29.9 3
30.8	33.11	53.8	44.94	64.2	56.94	47.8	10.44	30.2
ne 9.7	33.44 33	55.8 20	45.27 33	66.2 20	57.28 34	45.7 21	11.35 91	31.0 8
19.7	33.77 33	57.9 21	45.59 32	68.3 21	57.62 34	43.8 19	12.24 89	32.4 14
29.7	34.08 31	60.2 23	45.90 31	70.5 22	57.95 33	42.2 16	13.09 85	34.4 20
ly 9.7	34.38 30	62.5 23	46.20 30	72.8 23	58.27 32	40.8 14	13.87 78	36.8 24
	34.38 28	62.5 24	46.20 28	72.8 22	58.27 30	40.8 12	13.87 69	36.8 28
19.6	34.66	64.9	46.48	75.0	58.57	39.6	14.56	39.6
29.6	34.90 24	67.2 23	46.72 24	77.1 21	58.83 26	38.8 8	15.15 59	42.8 32
g. 8.6	35.11 21	69.5 23	46.93 21	79.1 20	59.06 23	38.3 5	15.64 49	46.3 35
18.6	35.28 17	71.6 21	47.10 17	81.0 19	59.25 19	38.1 2	16.00 36	50.0 37
28.5	35.40 12	73.5 19	47.22 12	82.6 16	59.39 14	38.2 1	16.23 23	53.8 38
	35.40 8	73.5 18	47.22 9	82.6 14	59.39 9	38.2 4	16.23 11	53.8 38
pt. 7.5	35.48	75.3	47.31	84.0	59.48	38.6	16.34	57.6
17.5	35.53 5	76.8 15	47.36 5	85.2 12	59.54 6	39.2 6	16.32 2	61.4 38
27.4	35.53 0	78.1 13	47.37 1	86.2 10	59.55 1	40.0 8	16.17 15	65.1 37
t. 7.4	35.51 2	79.2 11	47.34 3	86.9 7	59.52 3	40.9 9	15.91 26	68.6 35
17.4	35.45 6	80.0 8	47.29 5	87.4 5	59.46 6	42.0 11	15.53 38	71.9 33
	35.45 8	80.0 5	47.29 8	87.4 3	59.46 9	42.0 11	15.53 48	71.9 29
27.4	35.37	80.5	47.21	87.7	59.37	43.1	15.05	74.8
v. 6.3	35.27 10	80.8 3	47.12 9	87.8 1	59.26 11	44.1 10	14.49 56	77.3 25
16.3	35.16 11	80.9 1	47.01 11	87.7 1	59.14 12	45.0 9	13.85 64	79.4 21
26.3	35.05 11	80.7 2	46.90 11	87.4 3	59.01 13	45.9 9	13.16 69	80.9 15
c. 6.3	34.93 12	80.3 4	46.79 12	86.9 5	58.89 12	46.6 7	12.43 73	81.8 9
	34.93 11	80.3 7	46.79 11	86.9 7	58.89 12	46.6 5	12.43 75	81.8 3
16.2	34.82	79.6	46.68	86.2	58.77	47.1	11.68	82.1
26.2	34.71 11	78.8 8	46.58 10	85.4 8	58.66 11	47.4 3	10.94 74	81.8 3
36.2	34.61 10	77.8 10	46.49 9	84.6 8	58.56 10	47.5 1	10.23 71	80.9 9
†, Tan δ	1.034	+0.263	1.012	+0.158	1.076	-0.397	3.847	+3.714
1 Place	31°.530	51'".74	43°.301	60'".14	54°.972	62'".67	11°.435	40'".18
1, D _u α	0.00	-0.02	0.00	-0.01	0.00	+0.03	-0.02	-0.24
, D _u δ	+0.4	-0.3	+0.4	-0.2	+0.4	-0.2	+0.4	-0.2

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	1 Gruis. Mag. 4.1		59 Pegasi. Mag. 5.2		5 Cassiop. (Heis). Mag. 5.6		φ Aquarii. Mag. 4.4	
	Right Ascension.	Declination S.	Right Ascension.	Declination N.	Right Ascension.	Declination N.	Right Ascension.	Declination S.
	h m	° '	h m	° '	h m	° '	h m	° '
	23 5	-45 41	23 7	+ 8 15	23 9	+56 41	23 9	- 6 30
	s	"	s	"	s	"	s	"
Jan. 1.2	33.45	99.2	26.62	33.3	9.95	73.2	55.34	28.4
11.2	33.31 ¹⁴	98.3 ⁹	26.54 ⁸	32.4 ⁹	9.70 ²⁵	71.8 ¹⁴	55.26 ⁸	28.9 ⁵
21.1	33.20 ¹¹	96.9 ¹⁴	26.47 ⁷	31.5 ⁹	9.48 ²²	70.0 ¹⁸	55.20 ⁶	29.3 ⁴
31.1	33.12 ⁸	95.2 ¹⁷	26.43 ⁴	30.5 ¹⁰	9.29 ¹⁹	67.7 ²³	55.16 ⁴	29.5 ²
Feb. 10.1	33.07 ⁵	93.1 ²¹	26.41 ²	29.7 ⁸	9.16 ¹³	65.2 ²⁵	55.14 ²	29.6 ¹
	33.07 ⁰	90.8 ²³	26.41 ⁰	28.9 ⁸	9.09 ⁷	62.5 ²⁷	55.15 ¹	29.5 ¹
Mar. 20.0	33.07	90.8	26.41	28.9	9.09	62.5	55.15	29.5
2.0	33.11 ⁴	88.3 ²⁵	26.45 ⁴	28.3 ⁶	9.08 ¹	59.7 ²⁸	55.19 ⁴	29.3 ²
12.0	33.19 ⁸	85.5 ²⁸	26.52 ⁷	27.9 ⁴	9.14 ⁶	57.0 ²⁷	55.26 ⁷	28.8 ⁵
22.0	33.32 ¹³	82.7 ²⁸	26.62 ¹⁰	27.7 ²	9.27 ¹³	54.5 ²⁵	55.36 ¹⁰	28.1 ⁷
31.9	33.50 ¹⁸	79.8 ²⁹	26.76 ¹⁴	27.8 ¹	9.48 ²¹	52.2 ²³	55.50 ¹⁴	27.1 ¹⁰
	33.50 ²²	76.9 ²⁹	26.94 ¹⁸	28.2 ⁴	9.75 ¹⁹	50.3 ¹⁹	55.67 ¹⁷	25.9 ¹²
Apr. 10.9	33.72	76.9	26.94	28.2	9.75	50.3	55.67	25.9
20.9	33.99 ²⁷	74.0 ²⁹	27.15 ²¹	28.9 ⁷	10.09 ³⁴	48.9 ¹⁴	55.88 ²¹	24.5 ¹⁴
30.9	34.30 ³¹	71.2 ²⁸	27.40 ²⁵	29.9 ¹⁰	10.48 ³⁹	47.9 ¹⁰	56.13 ²⁵	22.9 ¹⁶
May 10.8	34.65 ³⁵	68.5 ²⁷	27.68 ²⁸	31.2 ¹³	10.92 ⁴⁴	47.5 ⁴	56.40 ²⁷	21.1 ¹⁸
20.8	35.03 ³⁸	66.1 ²⁴	27.98 ³⁰	32.8 ¹⁶	11.39 ⁴⁷	47.6 ¹	56.69 ²⁹	19.1 ²⁰
	35.03 ⁴⁰	64.0 ²¹	28.29 ³¹	34.6 ¹⁸	11.88 ⁴⁹	48.3 ⁷	57.00 ³¹	17.1 ²⁰
June 30.8	35.43 ⁴¹	62.2 ¹⁸	28.61 ³²	36.6 ²⁰	12.38 ⁵⁰	49.6 ¹³	57.33 ³³	15.1 ²⁰
9.7	35.84 ⁴¹	60.8 ¹⁴	28.93 ³²	38.8 ²²	12.87 ⁴⁹	51.3 ¹⁷	57.65 ³²	13.0 ²¹
19.7	36.26 ⁴²	59.7 ¹¹	29.25 ³²	41.0 ²²	13.34 ⁴⁷	53.5 ²²	57.97 ³²	11.0 ²⁰
29.7	36.67 ⁴¹	59.1 ⁶	29.55 ³⁰	43.2 ²²	13.78 ⁴⁴	56.1 ²⁶	58.27 ³⁰	9.2 ¹⁸
July 9.7	37.06 ³⁹	59.1 ²	29.55 ²⁸	45.4 ²²	14.18 ⁴⁰	59.0 ²⁹	58.55 ²⁸	7.5 ¹⁷
	37.42 ³³	58.9 ²	29.83 ²⁴	47.5 ²¹	14.53 ³⁵	62.2 ³²	58.80 ²⁵	6.0 ¹⁵
Aug. 29.6	37.75 ²⁸	59.8 ⁷	30.07 ²²	49.4 ¹⁹	14.83 ³⁰	65.6 ³⁴	59.02 ²²	4.7 ¹³
8.6	38.03 ²³	60.9 ¹¹	30.29 ¹⁷	51.2 ¹⁸	15.07 ²⁴	69.1 ³⁵	59.20 ¹⁸	3.7 ¹⁰
18.6	38.26 ¹⁷	62.3 ¹⁴	30.46 ¹³	52.8 ¹⁶	15.24 ¹⁷	72.7 ³⁶	59.34 ¹⁴	2.9 ⁸
28.5	38.43 ¹¹	63.9 ¹⁶	30.59 ⁹	54.2 ¹⁴	15.34 ¹⁰	76.2 ³⁵	59.44 ¹⁰	2.4 ⁵
Sept. 7.5	38.54 ⁵	65.8 ¹⁹	30.68 ⁵	55.4 ¹²	15.38 ⁴	79.7 ³⁵	59.49 ⁵	2.1 ³
17.5	38.59 ⁰	67.8 ²⁰	30.73 ²	56.3 ⁹	15.36 ²	83.0 ³³	59.51 ²	2.0 ¹
27.4	38.59 ⁶	69.8 ²⁰	30.75 ²	57.0 ⁷	15.29 ⁷	86.0 ³⁰	59.49 ²	2.2 ²
Oct. 7.4	38.53 ¹⁰	71.8 ²⁰	30.73 ⁵	57.5 ⁵	15.16 ¹³	88.8 ²⁸	59.45 ⁴	2.5 ³
17.4	38.43 ¹⁵	73.7 ¹⁹	30.68 ⁷	57.8 ³	14.98 ¹⁸	91.3 ²⁵	59.38 ⁷	2.9 ⁴
Nov. 27.4	38.28 ¹⁷	75.3 ¹⁶	30.61 ⁹	57.8 ⁰	14.77 ²¹	93.3 ²⁰	59.28 ¹⁰	3.5 ⁶
5.3	38.11 ²⁰	76.6 ¹³	30.52 ¹¹	57.7 ¹	14.53 ²⁴	94.8 ¹⁵	59.18 ¹⁰	4.1 ⁶
16.3	37.91 ²⁰	77.6 ¹⁰	30.42 ¹¹	57.3 ⁴	14.27 ²⁶	95.9 ¹¹	59.07 ¹¹	4.7 ⁷
Dec. 26.3	37.71 ²⁰	78.2 ⁶	30.31 ¹¹	56.8 ⁵	13.99 ²⁸	96.4 ⁵	58.96 ¹¹	5.4 ⁶
6.3	37.51 ²⁰	78.3 ¹	30.20 ¹¹	56.2 ⁶	13.70 ²⁹	96.4 ⁶	58.86 ¹⁰	6.0 ⁶
	37.31 ¹⁸	78.0 ³	30.09 ¹⁰	55.4 ⁸	13.42 ²⁸	95.8 ¹¹	58.76 ¹⁰	6.6 ⁶
16.2	37.13 ¹⁷	77.3 ⁷	29.99 ⁹	54.6 ⁸	13.16 ²⁶	94.7 ¹¹	58.67 ⁹	7.1 ⁵
36.2	36.96	77.3	29.00	54.6	13.16	94.7	58.67	7.1
Sec δ, Tan δ	1.432	-1.025	1.010	+0.145	1.821	+1.523	1.006	-0.114
Mean Place	33°.109	86°'.60	26°.665	30°'.12	11°.138	56°'.28	55°.235	26°'.81
D'ψ a, Dω a	+0.01	+0.07	0.00	-0.01	-0.01	-0.10	0.00	+0.01
Dψ δ, Dω δ	+0.4	-0.2	+0.4	-0.2	+0.4	-0.2	+0.4	-0.2

FOR THE UPPER TRANSIT AT WASHINGTON.

San Solar Date.	ψ Aquarii. Mag. 4.5		γ Tucanae. Mag. 4.1		γ Piscium. Mag. 3.8		γ Sculptoris. Mag. 4.5	
	Right Ascension.	Declination S.	Right Ascension.	Declination S.	Right Ascension.	Declination N.	Right Ascension.	Declination S.
	h m	° '	h m	° '	h m	° '	h m	° '
	23 11	— 9 32	23 12	— 58 41	23 12	+ 2 49	23 14	— 32 59
	"	"	"	"	"	"	"	"
Jan. 1.2	26.52	65.7	28.99	83.0	45.55	5.2	14.52	52.5
11.2	26.44	66.1	28.75	81.6	45.47	4.5	14.41	52.1
21.1	26.38	66.3	28.56	79.8	45.41	3.8	14.32	51.3
31.1	26.34	66.4	28.41	77.5	45.37	3.1	14.26	50.3
Feb. 10.1	26.32	66.3	28.31	74.9	45.35	2.5	14.23	48.9
20.1	26.32	66.1	28.27	72.0	45.35	2.1	14.22	47.3
Mar. 2.0	26.36	65.6	28.28	68.9	45.38	1.8	14.25	45.4
12.0	26.43	64.9	28.35	65.6	45.45	1.7	14.32	43.4
22.0	26.53	64.0	28.49	62.3	45.55	1.8	14.43	41.1
31.9	26.67	62.9	28.69	58.9	45.68	2.2	14.58	38.7
Apr. 10.9	26.84	61.6	28.95	55.5	45.86	2.9	14.76	36.2
20.9	27.05	60.0	29.28	52.3	46.07	3.9	14.99	33.7
30.9	27.30	58.2	29.65	49.3	46.31	5.2	15.25	31.1
May 10.8	27.57	56.3	30.07	46.5	46.58	6.7	15.55	28.6
20.8	27.87	54.3	30.53	44.1	46.88	8.4	15.88	26.2
30.8	28.18	52.3	31.03	42.0	47.19	10.3	16.23	24.0
June 9.8	28.50	50.2	31.55	40.3	47.51	12.3	16.59	22.0
19.7	28.83	48.2	32.07	39.0	47.83	14.4	16.95	20.2
29.7	29.15	46.2	32.58	38.3	48.15	16.5	17.31	18.8
July 9.7	29.46	44.4	33.08	38.0	48.45	18.6	17.66	17.7
19.6	29.74	42.8	33.54	38.2	48.73	20.6	17.98	17.0
29.6	30.00	41.4	33.95	38.9	48.99	22.5	18.27	16.6
Aug. 8.6	30.22	40.3	34.31	40.1	49.20	24.3	18.52	16.6
18.6	30.40	39.4	34.60	41.7	49.38	25.8	18.73	17.0
28.5	30.54	38.8	34.82	43.6	49.52	27.1	18.89	17.7
Sept. 7.5	30.64	38.5	34.96	45.8	49.62	28.2	19.01	18.7
17.5	30.70	38.4	35.02	48.2	49.68	29.1	19.07	20.0
27.5	30.72	38.5	35.01	50.7	49.70	29.7	19.08	21.4
Oct. 7.4	30.71	38.8	34.92	53.2	49.69	30.1	19.05	22.9
17.4	30.66	39.3	34.76	55.6	49.65	30.2	18.99	24.5
27.4	30.59	39.9	34.54	57.7	49.58	30.2	18.89	26.0
Nov. 6.3	30.50	40.5	34.28	59.5	49.50	30.1	18.76	27.4
16.3	30.40	41.2	33.99	61.0	49.40	29.8	18.62	28.7
26.3	30.29	41.9	33.68	62.0	49.30	29.3	18.47	29.7
Dec. 6.3	30.18	42.6	33.37	62.5	49.19	28.7	18.32	30.4
16.2	30.07	43.2	33.06	62.5	49.09	28.1	18.18	30.8
26.2	29.97	43.7	32.77	61.9	48.99	27.4	18.04	30.9
36.2	29.88	44.2	32.51	60.8	48.90	26.7	17.92	30.7
1, Tan δ	1.014	-0.168	1.925	-1.645	1.001	+0.049	1.192	-0.649
1 Place	26°.377	63''.17	28°.514	68''.12	45°.512	3''.66	14°.195	43''.05
1, D_{α}	0.00	+0.01	+0.01	+0.11	0.00	0.00	0.00	+0.04
, D_{δ}	+0.4	-0.2	+0.4	-0.2	+0.4	-0.2	+0.4	-0.2

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	o Cephei. Mag. 4.9		τ Pegasi. Mag. 4.6		b ¹ Aquarii. Mag. 4.2		4 Cassiopeiæ. Mag. 5.2	
	Right Ascension.	Declination N.	Right Ascension.	Declination N.	Right Ascension.	Declination S.	Right Ascension.	Declination N.
	h m	° '	h m	° '	h m	° '	h m	° '
	23 15	+67 38	23 16	+23 16	23 18	-20 33	23 21	+61 48
	s	"	s	"	s	"	s	"
Jan. 1.2	5.78	66.0	25.47	38.0	30.72	59.2	1.93	76.4
11.2	5.34 ⁴⁴	64.7 ¹³	25.37 ¹⁰	36.8 ¹²	30.63 ⁹	59.2 ⁰	1.60 ³³	75.1 ¹³
21.1	4.95 ³⁹	63.0 ¹⁷	25.28 ⁹	35.5 ¹³	30.56 ⁷	59.0 ²	1.30 ³⁰	73.4 ¹⁷
31.1	4.62 ³³	60.7 ²³	25.21 ⁷	34.0 ¹⁵	30.50 ⁶	58.6 ⁴	1.05 ²⁵	71.2 ²²
Feb. 10.1	4.36 ²⁶	58.1 ²⁶	25.17 ⁴	32.4 ¹⁶	30.47 ³	57.9 ⁷	0.85 ²⁰	68.7 ²⁵
	17	28	2	15	0	9	13	27
20.1	4.19	55.3	25.15	30.9	30.47	57.0	0.72	66.0
Mar. 2.0	4.12 ⁷	52.3 ³⁰	25.17 ²	29.5 ¹⁴	30.50 ³	55.9 ¹¹	0.66 ⁶	63.2 ²⁸
12.0	4.15 ³	49.4 ²⁹	25.23 ⁶	28.2 ¹³	30.56 ⁶	54.5 ¹⁴	0.69 ³	60.3 ²⁹
22.0	4.29 ⁴⁴	46.5 ²⁹	25.32 ⁹	27.2 ¹⁰	30.65 ⁹	52.9 ¹⁶	0.80 ¹¹	57.6 ²⁷
31.9	4.53 ²⁴	43.9 ²⁶	25.46 ¹⁴	26.4 ⁸	30.79 ¹⁴	51.1 ¹⁸	1.00 ²⁰	55.1 ²⁵
	34	23	18	4	17	19	28	21
Apr. 10.9	4.87	41.6	25.64	26.0	30.96	49.2	1.28	52.9
20.9	5.31 ⁴⁴	39.7 ¹⁹	25.86 ²²	25.9 ¹	31.17 ²¹	47.2 ²⁰	1.63 ³⁵	51.2 ¹⁷
30.9	5.82 ⁵¹	38.4 ¹³	26.12 ²⁶	26.3 ⁴	31.41 ²⁴	45.0 ²²	2.05 ⁴²	50.0 ¹²
May 10.8	6.39 ⁵⁷	37.6 ⁸	26.40 ²⁸	27.0 ⁷	31.69 ²⁸	42.8 ²²	2.53 ⁴⁸	49.3 ⁷
20.8	7.02 ⁶³	37.3 ³	26.71 ³¹	28.1 ¹¹	31.99 ³⁰	40.5 ²³	3.05 ⁵²	49.1 ²
	65	4	33	15	32	22	54	4
30.8	7.67	37.7	27.04	29.6	32.31	38.3	3.59	49.5
June 9.8	8.33 ⁶⁶	38.6 ⁹	27.38 ³⁴	31.4 ¹⁸	32.64 ³³	36.2 ²¹	4.14 ⁵⁵	50.5 ¹⁰
19.7	8.98 ⁶⁵	40.0 ¹⁴	27.72 ³⁴	33.4 ²⁰	32.98 ³⁴	34.3 ¹⁹	4.70 ⁵⁶	52.0 ¹⁵
29.7	9.61 ⁶³	42.0 ²⁰	28.05 ³³	35.7 ²³	33.31 ³³	32.5 ¹⁸	5.23 ⁵³	54.0 ²⁰
July 9.7	10.19 ⁵⁸	44.4 ²⁴	28.37 ³²	38.1 ²⁴	33.63 ³²	31.0 ¹⁵	5.73 ⁵⁰	56.4 ²⁴
	53	28	29	25	30	12	46	28
19.6	10.72	47.2	28.66	40.6	33.93	29.8	6.19	59.2
29.6	11.18 ⁴⁶	50.4 ³²	28.92 ²⁶	43.2 ²⁶	34.20 ²⁷	28.9 ⁹	6.59 ⁴⁰	62.4 ³²
Aug. 8.6	11.57 ³⁹	53.8 ³⁴	29.15 ²³	45.8 ²⁶	34.44 ²⁴	28.3 ⁶	6.93 ³⁴	65.7 ³³
18.6	11.87 ³⁰	57.4 ³⁶	29.33 ¹⁸	48.3 ²⁵	34.64 ²⁰	28.0 ³	7.20 ²⁷	69.3 ³⁶
28.5	12.08 ²¹	61.1 ³⁷	29.47 ¹⁴	50.7 ²⁴	34.79 ¹⁵	28.0 ⁰	7.41 ²¹	72.9 ³⁶
	13	38	10	22	11	3	13	36
Sept. 7.5	12.21	64.9	29.57	52.9	34.90	28.3	7.54	76.5
17.5	12.25 ⁴	68.6 ³⁷	29.63 ⁶	54.9 ²⁰	34.97 ⁷	28.8 ⁵	7.59 ⁵	80.1 ³⁶
27.5	12.20 ⁵	72.2 ³⁶	29.65 ²	56.7 ¹⁸	34.99 ²	29.6 ⁸	7.58 ¹	83.6 ³⁵
Oct. 7.4	12.07 ¹³	75.6 ³⁴	29.64 ¹	58.3 ¹⁶	34.97 ²	30.5 ⁹	7.50 ⁸	86.8 ³²
17.4	11.86 ²¹	78.7 ³¹	29.59 ⁵	59.6 ¹³	34.93 ⁴	31.5 ¹⁰	7.35 ¹⁵	89.8 ³⁰
	28	29	7	10	8	11	20	27
27.4	11.58	81.6	29.52	60.6	34.85	32.6	7.15	92.5
Nov. 6.3	11.24 ³⁴	84.0 ²⁴	29.42 ¹⁰	61.3 ⁷	34.75 ¹⁰	33.7 ¹¹	6.91 ²⁴	94.8 ²⁵
16.3	10.86 ³⁸	86.0 ²⁰	29.31 ¹¹	61.7 ⁴	34.64 ¹¹	34.7 ¹⁰	6.62 ²⁹	96.6 ¹⁸
26.3	10.43 ⁴³	87.4 ¹⁴	29.19 ¹²	61.8 ¹	34.52 ¹²	35.6 ⁹	6.30 ³²	98.0 ¹⁴
Dec. 6.3	9.97 ⁴⁶	88.3 ⁹	29.07 ¹²	61.6 ²	34.40 ¹²	36.4 ⁸	5.96 ³⁴	98.8 ⁸
	46	2	13	5	12	6	35	1
16.2	9.51	88.5	28.94	61.1	34.28	37.0	5.61	99.0
26.2	9.04 ⁴⁷	88.2 ³	28.82 ¹²	60.3 ⁸	34.16 ¹²	37.3 ³	5.26 ³⁵	98.7 ³
36.2	8.59 ⁴⁵	87.3 ⁹	28.71 ¹¹	59.3 ¹⁰	34.06 ¹⁰	37.5 ²	4.92 ³⁴	97.8 ⁹
Sec δ, Tan δ	2.630	+2.432	1.089	+0.430	1.068	-0.375	2.118	+1.867
Mean Place	7 ^s .766	46 ^m .70	25 ^s .654	29 ^m .52	30 ^s .455	53 ^m .33	3 ^s .291	57 ^m .70
D ^ψ α, D _ω α	-0.01	-0.16	0.00	-0.03	0.00	+0.02	-0.01	-0.12
D ^ψ δ, D _ω δ	+0.4	-0.2	+0.4	-0.2	+0.4	-0.2	+0.4	-0.2

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	♊ Pegasi. Mag. 4.6		♋ Piscium. Mag. 4.9		♌ Piscium. Mag. 4.4		♍ Pegasi. Mag. 4.7	
	Right Ascension.	Declination N.	Right Ascension.	Declination N.	Right Ascension.	Declination N.	Right Ascension.	Declination N.
	h m	° '	h m	° '	h m	° '	h m	° '
	23 21	+ 22 56	23 22	+ 0 47	23 23	+ 5 54	23 24	+ 12 17
	s	"	s	"	s	"	s	"
an. 1.2	7.94	17.9	34.62	25.9	39.41	46.2	51.28	34.6
11.2	7.84 ¹⁰	16.8 ¹¹	34.54 ⁸	25.2 ⁷	39.32 ⁹	45.4 ⁸	51.19 ⁹	33.7 ⁹
21.1	7.75 ⁹	15.5 ¹³	34.47 ⁷	24.6 ⁶	39.25 ⁷	44.6 ⁸	51.12 ⁷	32.7 ¹⁰
31.1	7.68 ⁷	14.0 ¹⁵	34.42 ⁵	24.0 ⁶	39.19 ⁶	43.8 ⁸	51.06 ⁶	31.7 ¹⁰
eb. 10.1	7.63 ⁵	12.5 ¹⁵	34.39 ³	23.6 ⁴	39.16 ³	43.1 ⁷	51.02 ⁴	30.6 ¹¹
	2	15	1	4	1	6	2	9
20.1	7.61	11.0	34.38	23.2	39.15	42.5	51.00	29.7
ar. 2.0	7.62 ¹	9.6 ¹⁴	34.40 ²	23.1 ¹	39.17 ²	42.0 ⁵	51.02 ²	28.8 ⁹
12.0	7.68 ⁶	8.4 ¹²	34.46 ⁶	23.1 ⁰	39.22 ⁵	41.8 ²	51.07 ⁵	28.2 ⁶
22.0	7.77 ⁹	7.3 ¹¹	34.55 ⁹	23.4 ³	39.31 ⁹	41.7 ¹	51.16 ⁹	27.8 ⁴
31.9	7.90 ¹³	6.6 ⁷	34.67 ¹²	23.9 ⁵	39.43 ¹²	42.0 ³	51.28 ¹²	27.6 ²
	18	4	17	8	16	5	16	2
pr. 10.9	8.08	6.2	34.84	24.7	39.59	42.5	51.44	27.8
20.9	8.29 ²¹	6.1 ¹	35.04 ²⁰	25.8 ¹¹	39.79 ²⁰	43.3 ⁸	51.65 ²¹	28.3 ⁵
30.9	8.54 ²⁵	6.5 ⁴	35.27 ²³	27.1 ¹³	40.03 ²⁴	44.4 ¹¹	51.88 ²³	29.1 ⁸
ay 10.8	8.82 ²⁸	7.2 ⁷	35.53 ²⁶	28.7 ¹⁶	40.29 ²⁶	45.8 ¹⁴	52.15 ²⁷	30.2 ¹¹
20.8	9.13 ³¹	8.3 ¹¹	35.82 ²⁹	30.4 ¹⁷	40.58 ²⁹	47.4 ¹⁶	52.45 ³⁰	31.6 ¹⁴
	33	14	31	20	31	18	31	17
30.8	9.46	9.7	36.13	32.4	40.89	49.2	52.76	33.3
ine 9.8	9.80 ³⁴	11.5 ¹⁸	36.45 ³²	34.4 ²⁰	41.21 ³²	51.2 ²⁰	53.08 ³²	35.2 ¹⁹
19.7	10.14 ³⁴	13.6 ²¹	36.77 ³²	36.5 ²¹	41.53 ³²	53.3 ²¹	53.41 ³³	37.3 ²¹
29.7	10.47 ³³	15.8 ²²	37.09 ³²	38.6 ²¹	41.85 ³²	55.4 ²¹	53.73 ³²	39.5 ²²
ily 9.7	10.79 ³²	18.2 ²⁴	37.40 ³¹	40.6 ²⁰	42.16 ³¹	57.6 ²²	54.04 ³¹	41.8 ²³
	29	25	28	20	28	21	29	22
19.6	11.08	20.7	37.68	42.6	42.44	59.7	54.33	44.0
29.6	11.35 ²⁷	23.3 ²⁶	37.94 ²⁶	44.4 ¹⁸	42.70 ²⁶	61.7 ²⁰	54.59 ²⁶	46.3 ²³
ug. 8.6	11.58 ²³	25.8 ²⁵	38.16 ²²	46.1 ¹⁷	42.93 ²³	63.6 ¹⁹	54.82 ²³	48.4 ²¹
18.6	11.77 ¹⁹	28.3 ²⁵	38.35 ¹⁹	47.5 ¹⁴	43.11 ¹⁸	65.3 ¹⁷	55.01 ¹⁹	50.4 ²⁰
28.5	11.92 ¹⁵	30.6 ²³	38.50 ¹⁵	48.7 ¹²	43.26 ¹⁵	66.8 ¹⁵	55.16 ¹⁵	52.2 ¹⁸
	10	22	11	10	11	12	11	17
pt. 7.5	12.02	32.8	38.61	49.7	43.37	68.0	55.27	53.9
17.5	12.09 ⁷	34.8 ²⁰	38.68 ⁷	50.4 ⁷	43.44 ⁷	69.0 ¹⁰	55.34 ⁷	55.3 ¹⁴
27.5	12.11 ²	36.6 ¹⁸	38.71 ³	50.9 ⁵	43.47 ³	69.8 ⁸	55.37 ³	56.5 ¹²
ct. 7.4	12.10 ¹	38.2 ¹⁶	38.70 ¹	51.2 ³	43.46 ¹	70.4 ⁶	55.36 ¹	57.4 ⁹
17.4	12.06 ⁴	39.5 ¹³	38.67 ³	51.2 ⁰	43.43 ³	70.8 ⁴	55.33 ³	58.1 ⁷
	7	10	6	1	6	1	6	5
27.4	11.99	40.5	38.61	51.1	43.37	70.9	55.27	58.6
ov. 6.3	11.90 ⁹	41.2 ⁷	38.53 ⁸	50.8 ³	43.29 ⁸	70.9 ⁰	55.19 ⁸	58.8 ²
16.3	11.80 ¹⁰	41.6 ⁴	38.44 ⁹	50.4 ⁴	43.20 ⁹	70.7 ²	55.10 ⁹	58.8 ⁰
26.3	11.68 ¹²	41.7 ²	38.34 ¹⁰	49.9 ⁵	43.10 ¹⁰	70.3 ⁴	55.00 ¹⁰	58.6 ²
ec. 6.3	11.56 ¹²	41.5 ²	38.23 ¹¹	49.4 ⁵	42.99 ¹¹	69.8 ⁵	54.89 ¹¹	58.3 ³
	13	4	11	7	10	6	11	6
16.2	11.43	41.1	38.12	48.7	42.89	69.2	54.78	57.7
26.2	11.31 ¹²	40.3 ⁸	38.02 ¹⁰	48.1 ⁶	42.78 ¹¹	68.5 ⁷	54.67 ¹¹	57.0 ⁷
36.2	11.20 ¹¹	39.3 ¹⁰	37.93 ⁹	47.4 ⁷	42.69 ⁹	67.7 ⁸	54.57 ¹⁰	56.1 ⁹
δ, Tan δ	1.086	+0.423	1.000	+0.014	1.005	+0.104	1.023	+0.218
an Place	8°.086	9''.35	34°.509	24''.69	39°.334	43''.24	51°.274	29''.41
α, D _α α	0.00	-0.03	0.00	0.00	0.00	-0.01	0.00	-0.01
δ, D _δ δ	+0.4	-0.2	+0.4	-0.2	+0.4	-0.2	+0.4	-0.2

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	β Sculptoris. Mag. 4.5		72 Pegasi (mean). Mag. 5.2		λ Andromedae. Mag. 4.0		ι Andromedae. Mag. 4.3	
	Right Ascension.	Declination S.	Right Ascension.	Declination N.	Right Ascension.	Declination N.	Right Ascension.	Declination N.
	h m	° '	h m	° '	h m	° '	h m	° '
	23 28	-38 16	23 29	+30 51	23 33	+45 59	23 33	+42 47
	"	"	"	"	"	"	"	"
Jan. 1.2	25.46	89.7	43.77	33.5	23.45	67.1	57.37	65.8
11.2	25.33 ¹³	89.2 ⁵	43.64 ¹³	32.4 ¹¹	23.27 ¹⁸	65.9 ¹²	57.20 ¹⁷	64.6 ¹²
21.1	25.22 ¹¹	88.3 ⁹	43.53 ¹¹	31.0 ¹⁴	23.10 ¹⁷	64.3 ¹⁶	57.05 ¹⁵	63.1 ¹⁵
31.1	25.13 ⁹	87.1 ¹²	43.44 ⁹	29.4 ¹⁶	22.95 ¹⁵	62.4 ¹⁹	56.91 ¹⁴	61.3 ¹⁸
Feb. 10.1	25.07 ⁶	85.5 ¹⁶	43.38 ⁶	27.6 ¹⁸	22.84 ¹¹	60.2 ²²	56.81 ¹⁰	59.2 ²¹
	3	19	4	18	7	23	7	23
20.1	25.04	83.6	43.34	25.8	22.77	57.9	56.74	56.9
Mar. 2.0	25.05 ¹	81.5 ²¹	43.34 ⁰	24.0 ¹⁸	22.74 ³	55.5 ²⁴	56.72 ²	54.7 ²²
12.0	25.10 ⁵	79.1 ²⁴	43.38 ⁴	22.4 ¹⁶	22.77 ³	53.2 ²³	56.75 ³	52.5 ²²
22.0	25.19 ⁹	76.6 ²⁵	43.46 ⁸	20.9 ¹⁵	22.85 ⁸	51.0 ²²	56.83 ⁸	50.4 ²¹
Apr. 1.0	25.32 ¹³	73.9 ²⁷	43.59 ¹³	19.7 ¹²	22.99 ¹⁴	49.0 ²⁰	56.96 ¹³	48.6 ¹⁸
	18	28	17	9	19	16	19	14
10.9	25.50	71.1	43.76	18.8	23.18	47.4	57.15	47.2
20.9	25.72 ²²	68.4 ²⁷	43.98 ²²	18.3 ⁵	23.44 ²⁶	46.2 ¹²	57.39 ²⁴	46.1 ¹¹
30.9	25.98 ²⁶	65.6 ²⁸	44.24 ²⁶	18.3 ⁰	23.74 ³⁰	45.5 ⁷	57.68 ²⁹	45.5 ⁶
May 10.8	26.28 ³⁰	62.9 ²⁷	44.53 ²⁹	18.6 ³	24.08 ³⁴	45.2 ³	58.01 ³³	45.3 ²
20.8	26.61 ³³	60.4 ²⁵	44.86 ³³	19.4 ⁸	24.45 ³⁷	45.4 ²	58.37 ³⁶	45.7 ⁴
	36	24	34	12	40	7	38	8
30.8	26.97	58.0	45.20	20.6	24.85	46.1	58.75	46.5
June 9.8	27.34 ³⁷	55.9 ²¹	45.55 ³⁵	22.2 ¹⁶	25.26 ⁴¹	47.3 ¹²	59.15 ⁴⁰	47.8 ¹³
19.7	27.72 ³⁸	54.1 ¹⁸	45.91 ³⁶	24.1 ¹⁹	25.68 ⁴²	49.0 ¹⁷	59.55 ⁴⁰	49.5 ¹⁷
29.7	28.10 ³⁸	52.7 ¹⁴	46.26 ³⁵	26.3 ²²	26.09 ⁴¹	51.0 ²⁰	59.94 ³⁹	51.6 ²¹
July 9.7	28.47 ³⁷	51.6 ¹¹	46.60 ³⁴	28.7 ²⁴	26.47 ³⁸	53.4 ²⁴	60.31 ³⁷	54.0 ²⁴
	35	6	31	26	36	27	35	27
19.7	28.82	51.0	46.91	31.3	26.83	56.1	60.66	56.7
29.6	29.13 ³¹	50.7 ³	47.19 ²⁸	34.0 ²⁷	27.16 ³³	59.0 ²⁹	60.97 ³¹	59.6 ²⁹
Aug. 8.6	29.41 ²⁸	50.9 ²	47.43 ²⁴	36.8 ²⁸	27.44 ²⁸	62.1 ³¹	61.24 ²⁷	62.6 ³⁰
18.6	29.64 ²³	51.5 ⁶	47.64 ²¹	39.6 ²⁸	27.67 ²³	65.3 ³²	61.47 ²³	65.7 ³¹
28.5	29.82 ¹⁸	52.4 ⁹	47.80 ¹⁶	42.2 ²⁶	27.86 ¹⁹	68.5 ³²	61.65 ¹⁸	68.8 ³¹
	14	13	12	26	13	32	13	31
Sept. 7.5	29.96	53.7	47.92	44.8	27.99	71.7	61.78	71.9
17.5	30.04 ⁸	55.2 ¹⁵	47.99 ⁷	47.3 ²⁵	28.07 ⁸	74.7 ³⁰	61.86 ⁸	74.8 ²⁹
27.5	30.07 ³	56.9 ¹⁷	48.02 ³	49.5 ²²	28.10 ³	77.6 ²⁹	61.89 ³	77.6 ²⁸
Oct. 7.4	30.05 ²	58.7 ¹⁸	48.02 ⁰	51.5 ²⁰	28.09 ¹	80.4 ²⁸	61.88 ¹	80.2 ²⁶
17.4	29.98 ⁷	60.5 ¹⁸	47.98 ⁴	53.2 ¹⁷	28.03 ⁶	82.8 ²⁴	61.83 ⁵	82.5 ²³
	9	18	7	14	10	21	8	20
27.4	29.89	62.3	47.91	54.6	27.93	84.9	61.75	84.5
Nov. 6.4	29.76 ¹³	64.0 ¹⁷	47.82 ⁹	55.7 ¹¹	27.81 ¹²	86.7 ¹⁸	61.63 ¹²	86.2 ¹⁷
16.3	29.61 ¹⁵	65.4 ¹⁴	47.70 ¹²	56.5 ⁸	27.66 ¹⁵	88.1 ¹⁴	61.49 ¹⁴	87.5 ¹³
26.3	29.45 ¹⁶	66.6 ¹²	47.58 ¹²	56.9 ⁰	27.48 ¹⁸	89.0 ⁹	61.33 ¹⁶	88.3 ⁸
Dec. 6.3	29.28 ¹⁷	67.4 ⁸	47.44 ¹⁴	56.9 ⁴	27.29 ¹⁹	89.5 ⁵	61.16 ¹⁷	88.7 ⁴
	17	5	14	3	20	0	18	0
16.2	29.11	67.9	47.30	56.6	27.09	89.5	60.98	88.7
26.2	28.96 ¹⁵	68.0 ¹	47.16 ¹⁴	56.0 ⁶	26.89 ²⁰	89.1 ⁴	60.79 ¹⁹	88.2 ⁵
36.2	28.81 ¹⁵	67.7 ³	47.03 ¹³	55.0 ¹⁰	26.70 ¹⁹	88.1 ¹⁰	60.62 ¹⁷	87.3 ⁹
Sec δ , Tan δ	1.274	-0.789	1.165	+0.598	1.440	+1.036	1.363	+0.966
Mean Place	25 ^s .007	79 ^m .13	43 ^s .986	22 ^m .14	23 ^s .972	51 ^m .23	57 ^s .797	50 ^m .73
D' ϕ α , D ₀ α	0.00	+0.05	0.00	-0.04	0.00	-0.07	0.00	-0.06
D' ϕ δ , D ₀ δ	+0.4	-0.1	+0.4	-0.1	+0.4	-0.1	+0.4	-0.1

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	ϵ Piscium. Mag. 4.3		γ Cephei. Mag. 3.4		κ Andromedæ. Mag. 4.3		ω^2 Aquarii. Mag. 4.6	
	Right Ascension.	Declination N.	Right Ascension.	Declination N.	Right Ascension.	Declination N.	Right Ascension.	Declination S.
	h m	° '	h m	° '	h m	° '	h m	° '
	23 35	+ 5 9	23 35	+77 9	23 36	+43 51	23 38	-15 0
	s	"	s	"	s	"	s	"
Jan. 1.2	34.80	59.0	47.65	50.4	12.60	62.8	19.25	57.1
11.2	34.71	58.2	46.80	49.5	12.43	61.6	19.16	57.4
21.1	34.63	57.4	46.01	48.1	12.27	60.1	19.08	57.4
31.1	34.57	56.7	45.31	46.2	12.13	58.3	19.01	57.3
Feb. 10.1	34.53	56.0	44.74	43.8	12.02	56.2	18.96	57.0
	2	6	43	27	7	23	2	6
20.1	34.51	55.4	44.31	41.1	11.95	53.9	18.94	56.4
Mar. 2.0	34.52	55.0	44.04	38.1	11.92	51.6	18.95	55.6
12.0	34.56	54.8	43.96	35.1	11.95	49.4	18.99	54.6
22.0	34.64	54.8	44.07	32.0	12.03	47.3	19.06	53.4
Apr. 1.0	34.75	55.0	44.35	29.1	12.16	45.4	19.17	51.9
	16	6	46	26	19	15	15	17
10.9	34.91	55.6	44.81	26.5	12.35	43.9	19.32	50.2
20.9	35.10	56.4	45.44	24.2	12.59	42.8	19.51	48.4
30.9	35.32	57.5	46.21	22.4	12.88	42.1	19.74	46.4
May 10.8	35.58	58.9	47.09	21.1	13.21	41.9	19.99	44.2
20.8	35.86	60.5	48.06	20.4	13.57	42.2	20.28	42.0
	31	18	103	2	39	7	31	22
30.8	36.17	62.3	49.09	20.2	13.96	42.9	20.59	39.8
June 9.8	36.49	64.2	50.15	20.6	14.36	44.2	20.91	37.7
19.7	36.81	66.3	51.20	21.6	14.77	45.8	21.24	35.6
29.7	37.13	68.4	52.22	23.1	15.16	47.9	21.57	33.7
July 9.7	37.44	70.6	53.19	25.2	15.54	50.3	21.89	31.9
	29	20	89	25	36	27	30	15
19.7	37.73	72.6	54.08	27.7	15.90	53.0	22.19	30.4
29.6	38.00	74.6	54.87	30.6	16.22	55.9	22.46	29.2
Aug. 8.6	38.23	76.4	55.55	33.8	16.49	58.9	22.71	28.2
18.6	38.43	78.1	56.09	37.3	16.72	62.0	22.92	27.6
28.5	38.59	79.5	56.50	41.0	16.91	65.2	23.09	27.2
	13	12	26	38	13	31	12	0
Sept. 7.5	38.72	80.7	56.76	44.8	17.04	68.3	23.21	27.2
17.5	38.80	81.7	56.88	48.7	17.13	71.3	23.30	27.4
27.5	38.84	82.5	56.85	52.5	17.16	74.1	23.34	27.8
Oct. 7.4	38.85	83.0	56.68	56.2	17.15	76.7	23.35	28.5
17.4	38.83	83.3	56.37	59.7	17.10	79.1	23.33	29.3
	5	1	44	32	8	21	6	9
27.4	38.78	83.4	55.93	62.9	17.02	81.2	23.27	30.2
Nov. 6.4	38.71	83.3	55.38	65.8	16.90	82.9	23.20	31.2
16.3	38.63	83.1	54.72	68.2	16.76	84.2	23.10	32.1
26.3	38.53	82.7	53.97	70.2	16.60	85.1	23.00	33.0
Dec. 6.3	38.43	82.1	53.15	71.6	16.42	85.6	22.89	33.8
	10	6	85	8	18	0	12	7
16.2	38.33	81.5	52.30	72.4	16.24	85.6	22.77	34.5
26.2	38.23	80.8	51.42	72.6	16.05	85.1	22.67	35.0
36.2	38.13	80.1	50.55	72.1	15.87	84.2	22.56	35.4
	10	7	87	5	18	9	11	4
δ , Tan δ	1.004	+0.090	4.501	+4.388	1.387	+0.061	1.035	-0.268
m Place	34°.656	55°.78	50°.979	28°.64	13°.039	47°.31	18°.918	53°.55
α , D_{α} α	0.00	-0.01	-0.01	-0.29	0.00	-0.06	0.00	+0.02
δ , D_{δ} δ	+0.4	-0.1	+0.4	-0.1	+0.4	-0.1	+0.4	-0.1

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	γ^1 Aquarii. Mag. 5.3		ψ Andromedæ. Mag. 5.1		41 H. Cephei. Mag. 5.0		δ Sculptoris. Mag. 4.6	
	Right Ascension.	Declination S.	Right Ascension.	Declination N.	Right Ascension.	Declination N.	Right Ascension.	Declination S.
	h m	° '	h m	° '	h m	° '	h m	° '
	23 39	— 18 44	23 41	+ 45 56	23 43	+ 67 19	23 44	— 28 35
	s	"	s	"	s	"	s	"
Jan. 1.2	48.04 ¹⁰	60.6 ²	48.60 ¹⁹	69.9 ¹¹	48.79 ⁴⁴	84.8 ⁹	30.46 ¹²	70.2 ¹
11.2	47.94 ⁸	60.8 ¹	48.41 ¹⁸	68.8 ¹⁵	48.35 ⁴¹	83.9 ¹⁴	30.34 ¹⁰	70.1 ⁴
21.2	47.86 ⁷	60.7 ³	48.23 ¹⁵	67.3 ¹⁸	47.94 ³⁷	82.5 ¹⁹	30.24 ⁸	69.7 ⁷
31.1	47.79 ⁵	60.4 ⁵	48.08 ¹²	65.5 ²¹	47.57 ³⁰	80.6 ²⁴	30.16 ⁶	69.0 ¹⁰
Feb. 10.1	47.74 ³	59.9 ⁸	47.96 ⁸	63.4 ²²	47.27 ²³	78.2 ²⁶	30.10 ⁴	68.0 ¹³
20.1	47.71 ¹	59.1 ¹⁰	47.88 ⁴	61.2 ²⁴	47.04 ¹⁴	75.6 ²⁸	30.06 ⁰	66.7 ¹⁶
Mar. 2.0	47.72 ⁴	58.1 ¹³	47.84 ²	58.8 ²³	46.90 ³	72.8 ²⁹	30.06 ³	65.1 ¹⁸
12.0	47.76 ⁷	56.8 ¹⁵	47.86 ⁷	56.5 ²²	46.87 ¹⁷	69.9 ²⁹	30.09 ⁶	63.3 ²¹
22.0	47.83 ¹¹	55.3 ¹⁶	47.93 ¹²	54.3 ¹⁹	46.94 ⁷	67.0 ²⁷	30.15 ¹¹	61.2 ²²
Apr. 1.0	47.94 ¹⁵	53.7 ¹⁹	48.05 ¹⁹	52.4 ¹⁷	47.11 ²⁸	64.3 ²⁵	30.26 ¹⁵	59.0 ²³
10.9	48.09 ¹⁹	51.8 ²¹	48.24 ²⁴	50.7 ¹²	47.39 ³⁸	61.8 ²¹	30.41 ¹⁹	56.7 ²⁵
20.9	48.28 ²²	49.7 ²¹	48.48 ²⁹	49.5 ¹⁶	47.77 ⁴⁶	59.7 ¹⁶	30.60 ²⁶	54.2 ²⁶
30.9	48.50 ²⁶	47.6 ²³	48.77 ³⁴	48.6 ⁹	48.23 ⁵⁴	58.1 ¹¹	30.83 ²³	51.6 ²⁵
May 10.9	48.76 ²⁹	45.3 ²³	49.11 ³⁷	48.3 ²	48.77 ⁶³	57.0 ⁶	31.09 ³⁰	49.1 ²⁵
20.8	49.05 ³¹	43.0 ²²	49.48 ³⁹	48.5 ⁶	49.36 ⁶³	56.4 ⁰	31.39 ³²	46.6 ²⁴
30.8	49.36 ³²	40.8 ²²	49.87 ⁴¹	49.1 ¹¹	49.99 ⁶⁶	56.4 ⁶	31.71 ³⁴	44.2 ²²
June 9.8	49.68 ³³	38.6 ²⁰	50.28 ⁴²	50.2 ¹⁶	50.65 ⁶⁶	57.0 ¹¹	32.05 ³⁵	42.0 ²⁰
19.7	50.01 ³⁴	36.6 ¹⁹	50.70 ⁴¹	51.8 ²⁰	51.31 ⁶⁵	58.1 ¹⁶	32.40 ³⁶	40.0 ¹⁸
29.7	50.35 ³²	34.7 ¹⁷	51.11 ³⁹	53.8 ²⁴	51.96 ⁶²	59.7 ²¹	32.76 ³²	38.2 ¹⁴
July 9.7	50.67 ³¹	33.0 ¹⁴	51.50 ³⁷	56.2 ²⁶	52.58 ⁵⁷	61.8 ²⁵	33.10 ³²	36.8 ¹¹
19.7	50.98 ²⁸	31.6 ¹¹	51.87 ³³	58.8 ²⁹	53.15 ⁵¹	64.3 ²⁹	33.42 ³⁰	35.7 ⁸
29.6	51.26 ²⁵	30.5 ⁸	52.20 ²⁹	61.7 ³⁰	53.66 ⁴⁵	67.2 ³²	33.72 ²⁷	34.9 ³
Aug. 8.6	51.51 ²¹	29.7 ⁵	52.49 ²⁵	64.7 ³¹	54.11 ³⁷	70.4 ³⁵	33.99 ²³	34.6 ⁰
18.6	51.72 ¹⁷	29.2 ¹	52.74 ²⁰	67.8 ³²	54.48 ³⁰	73.9 ³⁷	34.22 ¹⁴	34.6 ⁷
28.6	51.89 ¹³	29.1 ²	52.94 ¹⁴	71.0 ³²	54.78 ²⁰	77.5 ³⁷	34.40 ¹⁴	35.0 ¹
Sept. 7.5	52.02 ⁹	29.3 ⁴	53.08 ⁹	74.2 ³¹	54.98 ¹²	81.2 ³⁷	34.54 ¹⁰	35.7 ¹⁰
17.5	52.11 ⁵	29.7 ⁷	53.17 ⁵	77.3 ²⁹	55.10 ⁴	84.9 ³⁶	34.64 ⁵	36.7 ¹²
27.5	52.16 ¹	30.4 ⁸	53.22 ⁸	80.2 ²⁸	55.14 ⁵	88.5 ³⁵	34.69 ¹	37.9 ¹⁴
Oct. 7.4	52.17 ³	31.2 ¹⁰	53.22 ⁵	83.0 ²⁴	55.09 ¹³	92.0 ³³	34.70 ³	39.3 ¹⁵
17.4	52.14 ⁶	32.2 ¹¹	53.17 ⁸	85.4 ²²	54.96 ²⁰	95.3 ³⁰	34.67 ⁷	40.8 ¹⁵
27.4	52.08 ⁸	33.3 ¹¹	53.09 ¹²	87.6 ¹⁹	54.76 ²⁷	98.3 ²⁷	34.60 ⁹	42.3 ¹⁵
Nov. 6.4	52.00 ⁹	34.4 ¹¹	52.97 ¹⁵	89.5 ¹⁴	54.49 ³²	101.0 ²²	34.51 ¹¹	43.8 ¹³
16.3	51.91 ¹¹	35.5 ¹⁰	52.82 ¹⁶	90.9 ¹⁰	54.17 ³⁸	103.2 ¹⁸	34.40 ¹³	45.1 ¹²
26.3	51.80 ¹²	36.5 ⁸	52.66 ¹⁹	91.9 ⁶	53.79 ⁴¹	105.0 ¹²	34.27 ¹³	46.3 ¹⁰
Dec. 6.3	51.68 ¹²	37.3 ⁷	52.47 ¹⁹	92.5 ¹	53.38 ⁴⁴	106.2 ⁷	34.14 ¹⁴	47.3 ⁷
16.3	51.56 ¹¹	38.0 ⁵	52.28 ²⁰	92.6 ³	52.94 ⁴⁶	106.9 ⁰	34.00 ¹³	48.0 ⁴
26.2	51.45 ¹¹	38.5 ³	52.08 ²⁰	92.3 ⁹	52.48 ⁴⁵	106.4 ⁵	33.87 ¹³	48.4 ¹
36.2	51.34 ¹¹	38.8 ³	51.88 ²⁰	91.4 ⁹	52.03 ⁴⁵	106.4 ⁵	33.74 ¹³	48.5 ¹
Sec δ , Tan δ	1.056	— 0.339	1.438	+ 1.034	2.596	+ 2.395	1.139	— 0.545
Mean Place	47°.668	55'".85	49°.039	53'".64	50°.271	63'".92	29°.985	68'".61
D' ψ a, D ω a	0.00	+ 0.02	0.00	— 0.07	0.00	— 0.16	0.00	+ 0.04
D' ψ δ , D ω δ	+ 0.4	— 0.1	+ 0.4	— 0.1	+ 0.4	— 0.1	+ 0.4	— 0.1

FOR THE UPPER TRANSIT AT WASHINGTON.

Sun Solar Date.	γ^1 Octantis. Mag. 5.1		ϕ Pegasi. Mag. 5.2		ρ Cassiopeiæ. Mag. 4.8		Groombridge 4163. Mag. 6.6	
	Right Ascension.	Declination S.	Right Ascension.	Declination N.	Right Ascension.	Declination N.	Right Ascension.	Declination N.
	h m	° '	h m	° '	h m	° '	h m	° '
	23 47	—82 28	23 48	+18 38	23 50	+57 1	23 50	+73 56
	s	"	s	"	s	"	s	"
n. 1.2	11.25	105.1	9.76	61.7	7.02	54.7	38.52	36.3
11.2	9.82 ¹⁴³	103.4 ¹⁷	9.66 ¹⁰	60.8 ⁹	6.74 ²⁸	53.8 ⁹	37.85 ⁶⁷	35.7 ⁶
21.2	8.52 ¹³⁰	101.1 ²³	9.56 ¹⁰	59.7 ¹¹	6.48 ²⁶	52.4 ¹⁴	37.22 ⁶³	35.4 ¹³
31.1	7.40 ¹¹²	98.4 ²⁷	9.48 ⁸	58.5 ¹²	6.24 ²⁴	50.5 ¹⁹	36.66 ⁵⁶	32.6 ¹⁸
b. 10.1	6.49 ⁹¹	95.2 ³²	9.41 ⁷	57.3 ¹²	6.05 ¹⁹	48.3 ²²	36.19 ⁴⁷	30.3 ²³
	69	35	4	12	14	24	37	26
20.1	5.80	91.7	9.37	56.1	5.91	45.9	35.82	27.7
ar. 2.0	5.35 ⁴⁵	88.0 ³⁷	9.36 ¹	55.0 ¹¹	5.82 ⁹	43.3 ²⁶	35.58 ²⁴	24.8 ²⁹
12.0	5.16 ¹⁹	84.2 ³⁸	9.39 ³	54.0 ¹⁰	5.81 ¹	40.6 ²⁷	35.48 ¹⁰	21.8 ³⁰
22.0	5.21 ⁵	80.2 ⁴⁰	9.45 ⁶	53.2 ⁸	5.87 ⁶	38.0 ²⁶	35.52 ⁴	18.8 ³⁰
pr. 1.0	5.52 ³¹	76.3 ³⁹	9.55 ¹⁰	52.7 ⁵	6.00 ¹³	35.6 ²⁴	35.72 ²⁰	16.0 ²⁸
	55	38	15	3	20	22	34	27
10.9	6.07	72.5	9.70	52.4	6.20	33.4	36.06	13.3
20.9	6.85 ⁷⁸	68.9 ³⁶	9.89 ¹⁹	52.5 ¹	6.48 ²⁸	31.7 ¹⁷	36.54 ⁴⁸	11.0 ²³
30.9	7.85 ¹⁰⁰	65.6 ³³	10.11 ²²	52.9 ⁴	6.82 ³⁴	30.4 ¹³	37.14 ⁶⁰	9.1 ¹⁹
ay 10.9	9.06 ¹²¹	62.6 ³⁰	10.38 ²⁷	53.7 ⁸	7.22 ⁴⁰	29.5 ⁹	37.84 ⁷⁰	7.8 ¹³
20.8	10.42 ¹³⁶	60.0 ²⁶	10.67 ²⁹	54.8 ¹¹	7.66 ⁴⁴	29.2 ³	38.62 ⁷⁸	6.9 ⁹
	150	22	31	14	48	2	84	3
30.8	11.92	57.8	10.98	56.2	8.14	29.4	39.46	6.6
me 9.8	13.53 ¹⁶¹	56.1 ¹⁷	11.31 ³³	57.9 ¹⁷	8.64 ⁵⁰	30.2 ⁸	40.32 ⁸⁶	6.9 ³
19.7	15.20 ¹⁶⁷	55.0 ¹¹	11.64 ³³	59.9 ²⁰	9.14 ⁵⁰	31.4 ¹²	41.20 ⁸⁸	7.8 ⁹
29.7	16.90 ¹⁷⁰	54.4 ⁶	11.97 ³³	62.0 ²¹	9.63 ⁴⁹	33.2 ¹⁸	42.06 ⁸⁶	9.2 ¹⁴
ily 9.7	18.57 ¹⁶⁷	54.3 ¹	12.30 ³³	64.3 ²³	10.11 ⁴⁸	35.3 ²¹	42.89 ⁸³	11.1 ¹⁹
	160	6	30	23	44	26	77	24
19.7	20.17	54.9	12.60	66.6	10.55	37.9	43.66	13.5
29.6	21.65 ¹⁴⁸	56.0 ¹¹	12.88 ²⁸	69.0 ²⁴	10.96 ⁴¹	40.8 ²⁹	44.36 ⁷⁰	16.2 ²⁷
ug. 8.6	22.96 ¹³¹	57.6 ¹⁶	13.13 ²³	71.3 ²³	11.31 ³⁵	43.9 ³¹	44.96 ⁶⁰	19.4 ³²
18.6	24.06 ¹¹⁰	59.6 ²⁰	13.34 ²¹	73.6 ²³	11.61 ³⁰	47.2 ³³	45.47 ⁵¹	22.8 ³⁴
28.6	24.92 ⁸⁶	62.1 ²⁵	13.52 ¹⁸	75.7 ²¹	11.86 ²⁵	50.6 ³⁴	45.87 ⁴⁰	26.4 ³⁶
	58	27	13	19	18	35	28	37
pt. 7.5	25.50	64.8	13.65	77.6	12.04	54.1	46.15	30.1
17.5	25.78 ²⁸	67.8 ³⁰	13.74 ⁹	79.4 ¹⁸	12.15 ¹¹	57.5 ³⁴	46.32 ¹⁷	33.9 ³⁸
27.5	25.76 ²	70.8 ³⁰	13.80 ⁶	81.0 ¹⁶	12.21 ⁶	60.9 ³⁴	46.37 ⁵	37.7 ³⁸
ct. 7.4	25.43 ³³	73.8 ³⁰	13.82 ²	82.3 ¹³	12.20 ¹	64.1 ³²	46.31 ⁶	41.4 ³⁷
17.4	24.80 ⁶³	76.6 ²⁸	13.81 ¹	83.4 ¹¹	12.15 ⁵	67.0 ²⁹	46.13 ¹⁸	44.9 ³⁵
	90	26	4	8	11	27	28	32
27.4	23.90	79.2	13.77	84.2	12.04	69.7	45.85	48.1
ov. 6.4	22.76 ¹¹⁴	81.4 ²²	13.70 ⁷	84.8 ⁶	11.88 ¹⁶	72.1 ²⁴	45.47 ³⁸	51.0 ²⁹
16.3	21.42 ¹³⁴	83.1 ¹⁷	13.62 ⁸	85.1 ³	11.68 ²⁰	74.0 ¹⁹	45.00 ⁴⁷	53.5 ²⁵
26.3	19.94 ¹⁴⁸	84.2 ¹¹	13.53 ⁹	85.2 ¹	11.45 ²³	75.5 ¹⁵	44.45 ⁵⁵	55.6 ²¹
ec. 6.3	18.36 ¹⁵⁸	84.8 ⁶	13.42 ¹¹	85.0 ²	11.20 ²⁵	76.5 ¹⁰	43.85 ⁶⁰	57.1 ¹⁵
	161	1	11	4	5	5	65	9
16.3	16.75	84.7	13.31	84.6	10.92	77.0	43.20	58.0
26.2	15.16 ¹⁵⁹	84.0 ⁷	13.19 ¹²	84.0 ⁶	10.64 ²⁸	76.9 ¹	42.52 ⁶⁸	58.3 ³
36.2	13.64 ¹⁵²	82.7 ¹³	13.08 ¹¹	83.2 ⁸	10.36 ²⁸	76.3 ⁶	41.85 ⁶⁷	58.0 ³
δ , Tan δ	7.650	—7.584	1.055	+0.338	1.838	+1.542	3.615	+3.474
m Place	9°.199	88°'.43	9°.684	53°'.44	7°.747	35°'.42	40°.703	14°'.18
α , D_{α} α	+0.01	+0.51	0.00	—0.02	0.00	—0.10	0.00	—0.23
δ , D_{δ} δ	+0.4	—0.1	+0.4	—0.1	+0.4	0.0	+0.4	0.0

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	ω Piscium. Mag. 4.0		ϵ Tucanae. Mag. 4.7		30 Piscium. Mag. 4.7		δ Ceti. Mag. 4.6	
	Right Ascension.	Declination N.	Right Ascension.	Declination S.	Right Ascension.	Declination S.	Right Ascension.	Declination S.
	h m s	° ' "	h m s	° ' "	h m s	° ' "	h m s	° ' "
	23 54	+ 6 23	23 55	-66 2	23 57	- 6 28	23 59	-17 48
Jan. 1.2	56.99	38.3	31.51	74.5	36.44	71.4	23.67	37.2
11.2	56.89	37.6	31.12	73.4	36.34	71.9	23.56	37.4
21.2	56.80	36.8	30.76	71.7	36.25	72.3	23.46	37.5
31.1	56.73	36.1	30.45	69.5	36.18	72.5	23.38	37.3
Feb. 10.1	56.67	35.4	30.20	66.9	36.12	72.6	23.32	36.8
20.1	56.63	34.8	30.01	63.9	36.08	72.5	23.27	36.1
Mar. 2.1	56.62	34.3	29.89	60.7	36.07	72.2	23.26	35.2
12.0	56.64	34.1	29.85	57.2	36.09	71.7	23.27	34.0
22.0	56.70	34.0	29.89	53.6	36.14	71.0	23.32	32.6
Apr. 1.0	56.79	34.2	30.01	49.9	36.23	70.0	23.41	31.0
10.9	56.93	34.6	30.22	46.2	36.36	68.8	23.54	29.1
20.9	57.10	35.4	30.50	42.6	36.53	67.4	23.71	27.1
30.9	57.31	36.4	30.86	39.2	36.73	65.8	23.91	25.0
May 10.9	57.56	37.7	31.29	36.1	36.97	63.9	24.16	22.7
20.8	57.83	39.2	31.79	33.2	37.24	62.0	24.43	20.4
30.8	58.13	41.0	32.34	30.7	37.54	59.9	24.73	18.1
June 9.8	58.45	42.9	32.92	28.6	37.85	57.8	25.05	15.8
19.8	58.77	44.9	33.53	27.0	38.17	55.6	25.38	13.7
29.7	59.09	47.0	34.16	25.9	38.49	53.6	25.71	11.7
July 9.7	59.41	49.2	34.77	25.4	38.81	51.6	26.04	9.9
19.7	59.71	51.3	35.36	25.4	39.11	49.8	26.35	8.4
29.6	59.99	53.3	35.91	25.9	39.40	48.2	26.64	7.2
Aug. 8.6	60.23	55.1	36.41	26.9	39.65	46.8	26.90	6.3
18.6	60.45	56.9	36.84	28.5	39.87	45.7	27.13	5.7
28.6	60.63	58.4	37.18	30.4	40.05	44.9	27.32	5.5
Sept. 7.5	60.77	59.7	37.43	32.7	40.19	44.3	27.47	5.6
17.5	60.87	60.7	37.58	35.3	40.29	44.0	27.57	5.9
27.5	60.93	61.6	37.64	38.1	40.36	43.9	27.64	6.6
Oct. 7.5	60.96	62.2	37.60	40.9	40.39	44.1	27.67	7.4
17.4	60.95	62.5	37.46	43.7	40.38	44.5	27.66	8.4
27.4	60.92	62.7	37.24	46.3	40.35	45.0	27.62	9.5
Nov. 6.4	60.87	62.7	36.94	48.6	40.30	45.6	27.56	10.6
16.3	60.80	62.5	36.59	50.5	40.22	46.4	27.47	11.7
26.3	60.71	62.1	36.19	52.0	40.13	47.1	27.37	12.8
Dec. 6.3	60.61	61.7	35.77	52.9	40.04	47.9	27.27	13.7
16.3	60.51	61.1	35.33	53.3	39.93	48.6	27.15	14.5
26.2	60.41	60.5	34.90	53.1	39.83	49.2	27.04	15.1
36.2	60.31	59.7	34.48	52.3	39.73	49.8	26.93	15.5
Sec δ , Tan δ	1.006	+0.112	2.463	-2.252	1.006	-0.114	1.050	-0.321
Mean Place	56°.738	34''.05	30°.465	59''.09	36°.059	71''.22	23°.188	33''.28
D ψ α , D ω α	0.00	-0.01	0.00	+0.15	0.00	+0.01	0.00	+0.02
D ψ δ , D ω δ	+0.4	0.0	+0.4	0.0	+0.4	0.0	+0.4	0.0

APPARENT PLACES OF CIRCUMPOLAR STARS
FOR THE UPPER TRANSIT AT WASHINGTON.

Octantis (G.). Mag. 5.6			31 Mensæ (G.). Mag. 6.2			7 Octantis (G.). Mag. 6.4			ζ Octantis. Mag. 5.4			η Octantis. Mag. 6.3		
n	Right Ascension.	Declination South.	Mean Solar Date.	Right Ascension.	Declination South.	Mean Solar Date.	Right Ascension.	Declination South.	Mean Solar Date.	Right Ascension.	Declination South.	Mean Solar Date.	Right Ascension.	Declination South.
1.	h m 1 42	° ' s -85 12	Jan.	h m 5 46	° ' s -84 49	Jan.	h m 7 17	° ' s -86 53	Jan.	h m 9 9	° ' s -85 19	Jan.	h m 10 59	° ' s -84 7
3	19.08	10.94	0.5	51.11	46.43	0.5	18.95	44.33	0.6	21.52	13.33	0.7	56.85	55.11
3	18.81	10.93	1.5	50.98	46.74	1.5	18.88	44.68	1.6	21.62	13.67	1.7	57.02	55.38
3	18.55	10.89	2.5	50.84	47.02	2.5	18.81	45.02	2.6	21.72	14.01	2.7	57.18	55.63
3	18.30	10.88	3.5	50.72	47.29	3.5	18.74	45.34	3.6	21.81	14.33	3.7	57.34	55.86
3	18.07	10.88	4.5	50.61	47.57	4.5	18.70	45.66	4.6	21.90	14.63	4.7	57.51	56.08
3	17.85	10.88	5.5	50.51	47.86	5.5	18.67	45.98	5.6	22.01	14.94	5.7	57.67	56.30
3	17.61	10.90	6.4	50.41	48.16	6.5	18.66	46.31	6.6	22.13	15.25	6.7	57.85	56.52
3	17.34	10.93	7.4	50.31	48.48	7.5	18.64	46.67	7.6	22.26	15.58	7.7	58.05	56.75
3	17.06	10.96	8.4	50.20	48.83	8.5	18.61	47.05	8.6	22.40	15.94	8.7	58.26	57.00
3	16.75	10.97	9.4	50.07	49.19	9.5	18.57	47.46	9.6	22.52	16.32	9.7	58.46	57.28
3	16.44	10.96	10.4	49.92	49.54	10.5	18.49	47.87	10.6	22.64	16.72	10.7	58.66	57.59
3	16.12	10.92	11.4	49.74	49.88	11.5	18.38	48.28	11.6	22.73	17.13	11.7	58.85	57.92
3	15.81	10.86	12.4	49.56	50.21	12.5	18.22	48.68	12.6	22.79	17.55	12.6	59.02	58.26
3	15.51	10.76	13.4	49.36	50.51	13.5	18.04	49.05	13.6	22.83	17.96	13.6	59.17	58.61
3	15.23	10.65	14.4	49.17	50.77	14.5	17.86	49.39	14.6	22.86	18.35	14.6	59.30	58.95
3	14.97	10.53	15.4	48.98	51.01	15.5	17.68	49.72	15.6	22.88	18.71	15.6	59.43	59.26
3	14.72	10.43	16.4	48.80	51.25	16.5	17.51	50.03	16.6	22.91	19.05	16.6	59.55	59.56
3	14.48	10.35	17.4	48.63	51.49	17.5	17.36	50.33	17.6	22.94	19.39	17.6	59.67	59.85
3	14.25	10.27	18.4	48.48	51.74	18.5	17.23	50.65	18.6	22.99	19.72	18.6	59.81	60.13
3	14.01	10.21	19.4	48.33	52.01	19.5	17.12	50.97	19.6	23.05	20.05	19.6	59.96	60.40
3	13.74	10.16	20.4	48.18	52.28	20.5	17.01	51.32	20.6	23.12	20.41	20.6	60.12	60.69
3	13.46	10.10	21.4	48.02	52.58	21.5	16.89	51.68	21.5	23.19	20.78	21.6	60.28	60.99
3	13.18	10.04	22.4	47.84	52.89	22.5	16.75	52.05	22.5	23.26	21.17	22.6	60.44	61.31
3	12.87	9.96	23.4	47.65	53.19	23.5	16.60	52.42	23.5	23.31	21.58	23.6	60.59	61.65
3	12.57	9.86	24.4	47.45	53.49	24.5	16.42	52.80	24.5	23.34	21.99	24.6	60.75	62.00
3	12.27	9.74	25.4	47.24	53.77	25.5	16.21	53.18	25.5	23.36	22.41	25.6	60.89	62.37
3	11.98	9.59	26.4	47.01	54.04	26.5	15.97	53.55	26.5	23.37	22.83	26.6	61.02	62.75
3	11.70	9.43	27.4	46.78	54.28	27.5	15.72	53.90	27.5	23.35	23.24	27.6	61.13	63.13
3	11.43	9.26	28.4	46.54	54.51	28.5	15.46	54.24	28.5	23.32	23.64	28.6	61.24	63.51
3	11.18	9.08	29.4	46.31	54.71	29.4	15.18	54.55	29.5	23.28	24.02	29.6	61.33	63.88
3	10.94	8.89	30.4	46.08	54.90	30.4	14.91	54.84	30.5	23.24	24.39	30.6	61.41	64.24
3	10.72	8.71	31.4	45.87	55.08	31.4	14.66	55.13	31.5	23.21	24.74	31.6	61.49	64.58
1.96	-11.92	11.10	-11.05	18.47	-18.45	12.26	-12.22	9.78	-9.73					
h 42 ^m	9°.88	5 ^h 46 ^m	38°.12	7 ^h 17 ^m	0°.79	9 ^h 9 ^m	14°.21	10 ^h 59 ^m	56°.00					
° 11'	57''-70	-84° 49'	49''-43	-86° 53'	53''-55	-85° 19'	28''-08	-84° 8'	11''-87					

[Eph 13]

APPARENT PLACES OF CIRCUMPOLAR STARS

FOR THE UPPER TRANSIT AT WASHINGTON.

4 Octants (G.). Mag. 5.6			31 Mense (G.). Mag. 6.2			7 Octants (G.). Mag. 6.4			5 Octants. Mag. 5.4			7 Octants. Mag. 6.3		
Mean Solar Date.	Right Ascension.	Declination South.	Mean Solar Date.	Right Ascension.	Declination South.	Mean Solar Date.	Right Ascension.	Declination South.	Mean Solar Date.	Right Ascension.	Declination South.	Mean Solar Date.	Right Ascension.	Declination South.
Feb.	h m ° '		Feb.	h m ° '		Feb.	h m ° '		Feb.	h m ° '		Feb.	h m ° '	
	1 42 -85 12			5 46 -84 49			7 17 -86 53			9 9 -85 19			11 0 -84 8	
0.2	10.72 8.71	0.4	45.87 55.08	0.4	45.87 55.08	0.4	14.66 55.13	0.5	23.21 24.74	0.6	1.49 4.58			
1.2	10.49 8.54	1.4	45.66 55.27	1.4	45.66 55.27	1.4	14.42 55.40	1.5	23.18 25.09	1.6	1.57 4.90			
2.2	10.25 8.39	2.4	45.45 55.46	2.4	45.45 55.46	2.4	14.19 55.68	2.5	23.17 25.43	2.6	1.67 5.23			
3.2	10.01 8.26	3.4	45.25 55.67	3.4	45.25 55.67	3.4	13.98 55.99	3.5	23.17 25.79	3.6	1.78 5.56			
4.2	9.75 8.13	4.4	45.05 55.90	4.4	45.05 55.90	4.4	13.77 56.32	4.5	23.16 26.17	4.6	1.90 5.90			
5.2	9.47 7.99	5.4	44.84 56.15	5.4	44.84 56.15	5.4	13.54 56.66	5.5	23.16 26.58	5.6	2.02 6.26			
6.2	9.18 7.83	6.4	44.60 56.41	6.4	44.60 56.41	6.4	13.28 57.02	6.5	23.15 27.00	6.6	2.14 6.65			
7.2	8.89 7.64	7.4	44.34 56.66	7.4	44.34 56.66	7.4	12.99 57.39	7.5	23.12 27.43	7.6	2.25 7.07			
8.2	8.59 7.42	8.4	44.07 56.88	8.4	44.07 56.88	8.4	12.66 57.74	8.5	23.06 27.87	8.6	2.34 7.50			
9.2	8.31 7.17	9.4	43.78 57.07	9.4	43.78 57.07	9.4	12.31 58.07	9.5	22.98 28.30	9.6	2.42 7.93			
10.2	8.06 6.91	10.4	43.49 57.24	10.4	43.49 57.24	10.4	11.95 58.37	10.5	22.88 28.71	10.6	2.47 8.35			
11.2	7.83 6.64	11.4	43.21 57.38	11.4	43.21 57.38	11.4	11.59 58.65	11.5	22.77 29.10	11.6	2.51 8.75			
12.2	7.61 6.38	12.3	42.96 57.50	12.4	42.96 57.50	12.4	11.23 58.90	12.5	22.66 29.47	12.6	2.54 9.14			
13.2	7.41 6.13	13.3	42.72 57.62	13.4	42.72 57.62	13.4	10.90 59.14	13.5	22.57 29.82	13.6	2.58 9.51			
14.2	7.21 5.90	14.3	42.48 57.75	14.4	42.48 57.75	14.4	10.58 59.38	14.5	22.48 30.15	14.6	2.62 9.86			
15.2	7.00 5.68	15.3	42.24 57.88	15.4	42.24 57.88	15.4	10.29 59.62	15.5	22.41 30.48	15.6	2.67 10.21			
16.2	6.79 5.47	16.3	42.01 58.04	16.4	42.01 58.04	16.4	10.00 59.89	16.5	22.35 30.82	16.6	2.73 10.57			
17.2	6.56 5.27	17.3	41.77 58.20	17.4	41.77 58.20	17.4	9.71 60.18	17.5	22.29 31.18	17.6	2.80 10.93			
18.2	6.32 5.07	18.3	41.53 58.38	18.4	41.53 58.38	18.4	9.41 60.47	18.5	22.23 31.56	18.6	2.88 11.31			
19.2	6.07 4.86	19.3	41.28 58.56	19.4	41.28 58.56	19.4	9.10 60.76	19.5	22.16 31.96	19.6	2.94 11.70			
20.2	5.82 4.63	20.3	41.01 58.73	20.4	41.01 58.73	20.4	8.76 61.06	20.5	22.07 32.36	20.6	3.01 12.11			
21.2	5.57 4.37	21.3	40.73 58.89	21.4	40.73 58.89	21.4	8.40 61.36	21.5	21.98 32.76	21.6	3.07 12.53			
22.1	5.32 4.10	22.3	40.45 59.04	22.4	40.45 59.04	22.4	8.02 61.65	22.5	21.87 33.16	22.6	3.11 12.95			
23.1	5.08 3.81	23.3	40.16 59.17	23.4	40.16 59.17	23.4	7.61 61.92	23.5	21.73 33.56	23.6	3.13 13.38			
24.1	4.87 3.50	24.3	39.86 59.27	24.4	39.86 59.27	24.4	7.19 62.17	24.5	21.58 33.94	24.6	3.14 13.81			
25.1	4.66 3.18	25.3	39.55 59.35	25.4	39.55 59.35	25.4	6.77 62.40	25.5	21.42 34.30	25.6	3.14 14.23			
26.1	4.47 2.86	26.3	39.26 59.41	26.4	39.26 59.41	26.4	6.35 62.61	26.5	21.26 34.64	26.6	3.13 14.64			
27.1	4.29 2.55	27.3	38.90 59.46	27.4	38.90 59.46	27.4	5.94 62.81	27.5	21.09 34.97	27.6	3.11 15.02			
28.1	4.13 2.25	28.3	38.72 59.51	28.4	38.72 59.51	28.4	5.55 62.99	28.5	20.93 35.29	28.6	3.10 15.39			
29.1	3.96 1.97	29.3	38.46 59.56	29.4	38.46 59.56	29.4	5.17 63.18	29.5	20.79 35.61	29.6	3.10 15.75			
30.1	3.79 1.69	30.3	38.21 59.63	30.4	38.21 59.63	30.4	4.82 63.38	30.5	20.66 35.93	30.6	3.10 16.11			
31.1	3.60 1.43	31.3	37.96 59.71	31.4	37.96 59.71	31.4	4.47 63.60	31.5	20.55 36.26	31.6	3.12 16.48			
11.95	-11.91	11.10	-11.06	18.49	-18.46	12.27	-12.23	9.79	-9.74					
1 ^h 42 ^m	9 ^h 88 ^m	5 ^h 46 ^m	38 ^h 12 ^m	7 ^h 17 ^m	5 ^h 07 ^m	9 ^h 9 ^m	14 ^h 21 ^m	10 ^h 59 ^m	56 ^h 00 ^m					
-85° 11'	57° 70'	-84° 49'	49° 43'	-86° 53'	53° 55'	-85° 19'	28° 08'	-84° 8'	11° 8'					

[Eph 15]

APPARENT PLACES OF CIRCUMPOLAR STARS

FOR THE UPPER TRANSIT AT WASHINGTON.

(G.). 6	31 Mense (G.). Mag. 6.2			7 Octantis (G.). Mag. 6.4			ζ Octantis. Mag. 5.4			η Octantis. Mag. 6.3		
Declination South.	Mean Solar Date.	Right Ascension.	Declination South.	Mean Solar Date.	Right Ascension.	Declination South.	Mean Solar Date.	Right Ascension.	Declination South.	Mean Solar Date.	Right Ascension.	Declination South.
° ' "		h m s	° ' "		h m s	° ' "		h m s	° ' "		h m s	° ' "
-85 11	Mar.	5 46	-84 49	Mar.	7 16	-86 54	Mar.	9 9	-85 19	Mar.	11 0	-84 8
"		s	"		s	"		s	"		s	"
62.25	0.3	38.72	59.51	0.4	65.55	2.99	0.4	20.93	35.29	0.5	3.10	15.39
61.97	1.3	38.46	59.56	1.4	65.17	3.18	1.4	20.79	35.61	1.5	3.10	15.75
61.69	2.3	38.21	59.63	2.4	64.82	3.38	2.4	20.66	35.93	2.5	3.10	16.11
61.43	3.3	37.96	59.71	3.4	64.47	3.60	3.4	20.55	36.26	3.5	3.12	16.48
61.17	4.3	37.70	59.82	4.4	64.11	3.83	4.4	20.44	36.62	4.5	3.15	16.86
60.90	5.3	37.42	59.95	5.4	63.73	4.09	5.4	20.31	37.00	5.5	3.18	17.27
60.61	6.3	37.12	60.06	6.3	63.33	4.35	6.4	20.17	37.38	6.5	3.20	17.70
60.29	7.3	36.80	60.15	7.3	62.89	4.60	7.4	20.01	37.77	7.5	3.20	18.15
59.94	8.3	36.48	60.23	8.3	62.42	4.84	8.4	19.83	38.16	8.5	3.19	18.59
59.57	9.3	36.16	60.27	9.3	61.94	5.04	9.4	19.62	38.52	9.5	3.16	19.03
59.19	10.3	35.85	60.28	10.3	61.45	5.21	10.4	19.40	38.86	10.5	3.11	19.45
58.82	11.3	35.55	60.26	11.3	60.97	5.36	11.4	19.18	39.17	11.5	3.06	19.86
58.46	12.3	35.26	60.24	12.3	60.52	5.50	12.4	18.97	39.47	12.5	3.00	20.24
58.13	13.3	34.98	60.22	13.3	60.09	5.62	13.4	18.77	39.75	13.5	2.95	20.60
57.80	14.3	34.72	60.21	14.3	59.67	5.75	14.4	18.59	40.03	14.5	2.91	20.95
57.49	15.3	34.47	60.21	15.3	59.28	5.88	15.4	18.42	40.30	15.5	2.87	21.30
57.19	16.3	34.20	60.23	16.3	58.89	6.04	16.4	18.25	40.58	16.5	2.84	21.65
56.89	17.3	33.94	60.27	17.3	58.50	6.21	17.4	18.08	40.88	17.5	2.82	22.02
56.59	18.3	33.67	60.31	18.3	58.09	6.38	18.4	17.92	41.20	18.5	2.80	22.40
56.27	19.3	33.39	60.34	19.3	57.67	6.57	19.4	17.74	41.53	19.5	2.77	22.80
55.92	20.2	33.10	60.37	20.3	57.22	6.75	20.4	17.55	41.86	20.5	2.74	23.20
55.56	21.2	32.80	60.38	21.3	56.76	6.93	21.4	17.34	42.18	21.5	2.70	23.60
55.19	22.2	32.50	60.37	22.3	56.28	7.08	22.4	17.12	42.50	22.5	2.64	24.01
54.80	23.2	32.19	60.34	23.3	55.79	7.21	23.4	16.88	42.81	23.5	2.57	24.43
54.41	24.2	31.88	60.29	24.3	55.29	7.32	24.4	16.63	43.10	24.5	2.48	24.83
54.01	25.2	31.58	60.21	25.3	54.79	7.42	25.4	16.38	43.37	25.5	2.38	25.21
53.62	26.2	31.29	60.12	26.3	54.30	7.49	26.4	16.13	43.61	26.4	2.28	25.57
53.23	27.2	31.02	60.03	27.3	53.83	7.56	27.4	15.88	43.85	27.4	2.18	25.92
52.86	28.2	30.75	59.94	28.3	53.38	7.62	28.4	15.64	44.07	28.4	2.08	26.26
52.51	29.2	30.49	59.86	29.3	52.95	7.68	29.4	15.43	44.30	29.4	2.00	26.58
52.18	30.2	30.24	59.80	30.3	52.53	7.76	30.4	15.22	44.53	30.4	1.93	26.91
51.86	31.2	29.99	59.76	31.3	52.12	7.86	31.4	15.02	44.79	31.4	1.87	27.25
-11.91	11.10	-11.06	18.50	-18.47	12.28	-12.24	9.79	-9.74				
9°.88	5 ^h 46 ^m	38°.12	7 ^h 17 ^m	0°.79	9 ^h 9 ^m	14°.21	10 ^h 59 ^m	56°.00				
57°.70	-84° 49'	49°.43	-86° 53'	53°.55	-85° 19'	28°.08	-84° 8'	11°.87				

[Eph 15]

APPARENT PLACES OF CIRCUMPOLAR STARS
FOR THE UPPER TRANSIT AT WASHINGTON.

4 Octantis (G.). Mag. 5.6			31 Menæ (G.). Mag. 6.2			7 Octantis (G.). Mag. 6.4			ζ Octantis. Mag. 5.4			7 Octanti Mag. 6.3	
Mean Solar Date.	Right Ascension.	Declination South.	Mean Solar Date.	Right Ascension.	Declination South.	Mean Solar Date.	Right Ascension.	Declination South.	Mean Solar Date.	Right Ascension.	Declination South.	Mean Solar Date.	Right Ascension.
Apr.	h m 1 41	° ' 85 11	Apr.	h m 5 46	° ' 84 49	Apr.	h m 7 16	° ' 86 54	Apr.	h m 9 9	° ' 85 19	Apr.	h m 10 59
	s	"		s	"		s	"		s	"		s
0.0	59.52	51.86	0.2	29.99	59.76	0.3	52.12	7.86	0.4	15.02	44.79	0.4	61.87
1.0	59.41	51.53	1.2	29.72	59.74	1.3	51.69	7.98	1.4	14.81	45.06	1.4	61.81
2.0	59.28	51.17	2.2	29.44	59.71	2.3	51.23	8.11	2.4	14.60	45.35	2.4	61.75
3.0	59.16	50.80	3.2	29.14	59.68	3.3	50.76	8.23	3.4	14.37	45.64	3.4	61.67
4.0	59.03	50.40	4.2	28.84	59.62	4.3	50.25	8.33	4.3	14.12	45.93	4.4	61.58
5.0	58.93	49.98	5.2	28.53	59.53	5.3	49.72	8.42	5.3	13.84	46.21	5.4	61.47
6.0	58.86	49.55	6.2	28.22	59.42	6.3	49.19	8.47	6.3	13.55	46.46	6.4	61.35
7.0	58.81	49.13	7.2	27.92	59.28	7.3	48.67	8.50	7.3	13.26	46.67	7.4	61.21
8.0	58.76	48.71	8.2	27.64	59.12	8.3	48.17	8.50	8.3	12.98	46.86	8.4	61.06
9.0	58.73	48.32	9.2	27.38	58.96	9.3	47.70	8.49	9.3	12.71	47.03	9.4	60.93
10.0	58.72	47.94	10.2	27.14	58.81	10.3	47.24	8.48	10.3	12.45	47.19	10.4	60.80
11.0	58.69	47.59	11.2	26.90	58.67	11.3	46.82	8.48	11.3	12.20	47.35	11.4	60.68
12.0	58.66	47.25	12.2	26.67	58.55	12.2	46.41	8.49	12.3	11.97	47.52	12.4	60.57
13.0	58.61	46.90	13.2	26.43	58.44	13.2	45.99	8.52	13.3	11.74	47.71	13.4	60.47
14.0	58.56	46.56	14.2	26.20	58.34	14.2	45.57	8.56	14.3	11.51	47.91	14.4	60.38
15.0	58.49	46.21	15.2	25.95	58.24	15.2	45.14	8.60	15.3	11.28	48.12	15.4	60.28
16.0	58.43	45.86	16.2	25.68	58.14	16.2	44.69	8.65	16.3	11.03	48.33	16.4	60.17
17.0	58.37	45.48	17.2	25.42	58.02	17.2	44.23	8.69	17.3	10.77	48.54	17.4	60.06
17.9	58.32	45.08	18.2	25.16	57.89	18.2	43.74	8.72	18.3	10.50	48.74	18.4	59.93
18.9	58.28	44.67	19.2	24.89	57.74	19.2	43.25	8.72	19.3	10.22	48.93	19.4	59.79
19.9	58.26	44.27	20.2	24.62	57.56	20.2	42.75	8.69	20.3	9.92	49.11	20.4	59.64
20.9	58.26	43.85	21.2	24.34	57.36	21.2	42.25	8.66	21.3	9.62	49.26	21.4	59.47
21.9	58.28	43.43	22.2	24.09	57.15	22.2	41.76	8.60	22.3	9.31	49.39	22.4	59.30
22.9	58.30	43.02	23.2	23.86	56.94	23.2	41.29	8.53	23.3	9.01	49.51	23.4	59.13
23.9	58.33	42.63	24.2	23.63	56.72	24.2	40.85	8.45	24.3	8.72	49.61	24.4	58.96
24.9	58.36	42.27	25.1	23.41	56.51	25.2	40.42	8.36	25.3	8.46	49.69	25.4	58.81
25.9	58.39	41.92	26.1	23.21	56.32	26.2	40.01	8.30	26.3	8.20	49.79	26.4	58.66
26.9	58.41	41.58	27.1	23.01	56.15	27.2	39.61	8.26	27.3	7.96	49.91	27.4	58.51
27.9	58.41	41.25	28.1	22.80	56.00	28.2	39.20	8.22	28.3	7.72	50.04	28.4	58.41
28.9	58.40	40.91	29.1	22.57	55.85	29.2	38.79	8.21	29.3	7.48	50.19	29.4	58.21
29.9	58.38	40.54	30.1	22.34	55.69	30.2	38.35	8.21	30.3	7.21	50.35	30.4	58.11
30.9	58.37	40.15	31.1	22.08	55.51	31.2	37.88	8.18	31.3	6.93	50.52	31.4	58.00
II.94	-II.90		II.10	-II.06		18.51	-18.48		12.28	-12.24		9.80	
1 ^h 42 ^m	0 ^h 88		5 ^h 46 ^m	38 ^h 12		7 ^h 17 ^m	0 ^h 79		9 ^h 9 ^m	14 ^h 21		10 ^h 59 ^m	
-85° 11'	57'' .70		-84° 49'	49'' .43		-86° 53'	53'' .55		-85° 19'	28'' .08		-84° 8'	

[Eph 15]

APPARENT PLACES OF CIRCUMPOLAR STARS

FOR THE UPPER TRANSIT AT WASHINGTON.

Octantis (G.). Mag. 5.6			31 Mensæ (G.). Mag. 6.2			7 Octantis (G.). Mag. 6.4			ζ Octantis. Mag. 5.4			η Octantis. Mag. 6.3		
h m	Right Ascension.	Declination South.	Mean Solar Date.	h m	Right Ascension.	Declination South.	Mean Solar Date.	h m	Right Ascension.	Declination South.	Mean Solar Date.	h m	Right Ascension.	Declination South.
58.37	40.15	1.1	22.08	55.51	1.2	37.88	8.18	1.3	66.93	50.52	1.4	58.00	36.95	
58.36	39.74	2.1	21.82	55.32	2.2	37.39	8.14	2.3	66.63	50.67	2.3	57.84	37.25	
58.38	39.31	3.1	21.57	55.11	3.2	36.89	8.07	3.3	66.32	50.80	3.3	57.66	37.54	
58.43	38.89	4.1	21.33	54.85	4.2	36.40	7.97	4.3	65.99	50.89	4.3	57.46	37.81	
58.49	38.47	5.1	21.10	54.58	5.2	35.93	7.84	5.3	65.67	50.95	5.3	57.26	38.05	
58.58	38.07	6.1	20.90	54.30	6.2	35.48	7.70	6.3	65.36	51.00	6.3	57.06	38.26	
58.68	37.70	7.1	20.71	54.03	7.2	35.06	7.55	7.3	65.08	51.03	7.3	56.87	38.45	
58.77	37.36	8.1	20.54	53.77	8.2	34.68	7.41	8.3	64.81	51.05	8.3	56.68	38.63	
58.85	37.04	9.1	20.38	53.53	9.2	34.31	7.29	9.3	64.55	51.08	9.3	56.52	38.81	
58.92	36.73	10.1	20.21	53.31	10.2	33.96	7.18	10.2	64.30	51.12	10.3	56.37	38.98	
58.98	36.41	11.1	20.05	53.10	11.2	33.60	7.08	11.2	64.06	51.17	11.3	56.22	39.17	
59.02	36.09	12.1	19.87	52.89	12.2	33.23	6.98	12.2	63.81	51.24	12.3	56.07	39.37	
59.06	35.76	13.1	19.69	52.68	13.2	32.85	6.89	13.2	63.56	51.30	13.3	55.92	39.57	
59.12	35.42	14.1	19.50	52.47	14.2	32.45	6.80	14.2	63.29	51.38	14.3	55.76	39.79	
59.17	35.07	15.1	19.31	52.25	15.2	32.03	6.70	15.2	63.01	51.44	15.3	55.59	40.00	
59.24	34.70	16.1	19.12	52.00	16.2	31.62	6.58	16.2	62.72	51.49	16.3	55.40	40.21	
59.33	34.33	17.1	18.93	51.73	17.2	31.19	6.44	17.2	62.43	51.53	17.3	55.21	40.42	
59.42	33.95	18.1	18.74	51.44	18.1	30.77	6.28	18.2	62.12	51.54	18.3	55.00	40.61	
59.54	33.57	19.1	18.56	51.13	19.1	30.35	6.10	19.2	61.82	51.53	19.3	54.79	40.78	
59.66	33.20	20.1	18.40	50.82	20.1	29.95	5.90	20.2	61.51	51.50	20.3	54.57	40.93	
59.81	32.86	21.1	18.24	50.51	21.1	29.58	5.70	21.2	61.22	51.46	21.3	54.36	41.06	
59.96	32.54	22.1	18.11	50.20	22.1	29.23	5.49	22.2	60.95	51.41	22.3	54.15	41.17	
60.09	32.23	23.1	17.99	49.90	23.1	28.91	5.29	23.2	60.69	51.36	23.3	53.96	41.28	
60.23	31.94	24.1	17.87	49.63	24.1	28.60	5.11	24.2	60.45	51.32	24.3	53.78	41.38	
60.34	31.66	25.1	17.76	49.38	25.1	28.29	4.95	25.2	60.22	51.30	25.3	53.62	41.50	
60.44	31.38	26.1	17.62	49.14	26.1	27.98	4.81	26.2	59.98	51.30	26.3	53.46	41.63	
60.53	31.08	27.1	17.48	48.90	27.1	27.64	4.68	27.2	59.73	51.31	27.3	53.29	41.78	
60.61	30.76	28.1	17.32	48.65	28.1	27.28	4.54	28.2	59.47	51.32	28.3	53.11	41.95	
60.70	30.43	29.1	17.15	48.39	29.1	26.89	4.38	29.2	59.19	51.33	29.3	52.92	42.11	
60.82	30.07	30.1	16.99	48.10	30.1	26.49	4.20	30.2	58.89	51.33	30.3	52.72	42.27	
60.96	29.70	31.1	16.84	47.77	31.1	26.10	3.99	31.2	58.59	51.30	31.3	52.50	42.41	
61.12	29.34	32.0	16.70	47.43	32.1	25.73	3.75	32.2	58.28	51.23	32.3	52.27	42.52	
93	-11.89	11.10	-11.05	18.50	-18.48	12.29	-12.24	9.80	-9.75					
42 ^m	9 ^s .88	5 ^h 46 ^m	38 ^s .12	7 ^h 17 ^m	0 ^s .79	9 ^h 9 ^m	14 ^s .21	10 ^h 59 ^m	56 ^s .00					
11'	57''-70	-84° 49'	49''-43	-86° 53'	53''-55	-85° 19'	28''-08	-84° 8'	11''-87					

APPARENT PLACES OF CIRCUMPOLAR STARS
FOR THE UPPER TRANSIT AT WASHINGTON.

4 Octantis (G.). Mag. 5.6			31 Menae (G.). Mag. 6.2			7 Octantis (G.). Mag. 6.4			5 Octantis. Mag. 5.4			7 Octantis. Mag. 6.3		
Mean Solar Date.	Right Ascension.	Declination South.	Mean Solar Date.	Right Ascension.	Declination South.	Mean Solar Date.	Right Ascension.	Declination South.	Mean Solar Date.	Right Ascension.	Declination South.	Mean Solar Date.	Right Ascension.	Declination South.
June	h m 1 42 s	° ' " 85 11 "	June	h m 5 46 s	° ' " 84 49 "	June	h m 7 16 s	° ' " 86 53 "	June	h m 9 8 s	° ' " 85 19 "	June	h m 10 50 s	° ' " 84 8 "
0.9	1.12	29.34	1.0	16.70	47.43	1.1	25.73	63.75	1.2	58.28	51.23	1.3	52.27	42.52
1.9	1.30	29.01	2.0	16.58	47.08	2.1	25.38	63.50	2.2	57.99	51.13	2.3	52.04	42.60
2.9	1.49	28.72	3.0	16.48	46.73	3.1	25.07	63.24	3.2	57.72	51.02	3.3	51.82	42.67
3.9	1.68	28.44	4.0	16.40	46.39	4.1	24.78	62.98	4.2	57.46	50.90	4.3	51.61	42.71
4.9	1.86	28.18	5.0	16.33	46.08	5.1	24.53	62.73	5.2	57.23	50.78	5.3	51.42	42.74
5.9	2.03	27.94	6.0	16.26	45.78	6.1	24.29	62.50	6.2	57.01	50.67	6.3	51.24	42.77
6.9	2.19	27.70	7.0	16.20	45.50	7.1	24.05	62.29	7.2	56.80	50.57	7.3	51.06	42.81
7.9	2.33	27.47	8.0	16.13	45.23	8.1	23.81	62.08	8.2	56.58	50.49	8.3	50.90	42.86
8.9	2.48	27.23	9.0	16.05	44.96	9.1	23.56	61.88	9.2	56.36	50.41	9.3	50.73	42.91
9.9	2.62	26.98	10.0	15.96	44.69	10.1	23.30	61.68	10.2	56.13	50.33	10.3	50.55	42.98
10.9	2.77	26.72	11.0	15.87	44.41	11.1	23.02	61.48	11.2	55.89	50.26	11.3	50.37	43.04
11.8	2.92	26.45	12.0	15.78	44.11	12.1	22.74	61.26	12.2	55.65	50.18	12.3	50.18	43.11
12.8	3.10	26.18	13.0	15.69	43.79	13.1	22.45	61.02	13.2	55.39	50.08	13.3	49.97	43.17
13.8	3.28	25.89	14.0	15.60	43.46	14.1	22.15	60.76	14.2	55.13	49.96	14.3	49.76	43.21
14.8	3.48	25.60	15.0	15.52	43.11	15.1	21.87	60.49	15.2	54.87	49.82	15.3	49.53	43.23
15.8	3.70	25.33	16.0	15.46	42.75	16.1	21.61	60.20	16.2	54.61	49.66	16.3	49.30	43.24
16.8	3.92	25.08	17.0	15.41	42.39	17.1	21.37	59.89	17.2	54.36	49.49	17.3	49.09	43.23
17.8	4.15	24.85	18.0	15.38	42.03	18.1	21.15	59.59	18.2	54.12	49.30	18.3	48.87	43.20
18.8	4.38	24.64	18.9	15.37	41.68	19.1	20.97	59.29	19.2	53.91	49.10	19.3	48.66	43.16
19.8	4.60	24.46	19.9	15.36	41.36	20.1	20.81	59.01	20.2	53.72	48.91	20.3	48.48	43.11
20.8	4.80	24.29	20.9	15.34	41.07	21.1	20.65	58.75	21.2	53.54	48.75	21.3	48.31	43.07
21.8	4.98	24.12	21.9	15.33	40.79	22.1	20.49	58.51	22.2	53.35	48.60	22.3	48.15	43.04
22.8	5.15	23.94	22.9	15.30	40.52	23.1	20.32	58.29	23.2	53.17	48.46	23.3	47.98	43.00
23.8	5.32	23.74	23.9	15.27	40.25	24.0	20.12	58.07	24.1	52.98	48.34	24.2	47.82	43.03
24.8	5.48	23.52	24.9	15.21	39.97	25.0	19.91	57.83	25.1	52.76	48.22	25.2	47.64	43.06
25.8	5.66	23.28	25.9	15.16	39.65	26.0	19.68	57.58	26.1	52.53	48.09	26.2	47.44	43.07
26.8	5.87	23.03	26.9	15.12	39.31	27.0	19.44	57.31	27.1	52.29	47.94	27.2	47.23	43.07
27.8	6.10	22.80	27.9	15.08	38.95	28.0	19.22	57.01	28.1	52.05	47.75	28.2	47.01	43.04
28.8	6.34	22.58	28.9	15.06	38.58	29.0	19.01	56.68	29.1	51.82	47.53	29.2	46.79	42.98
29.8	6.60	22.39	29.9	15.07	38.21	30.0	18.85	56.34	30.1	51.61	47.30	30.2	46.57	42.90
30.8	6.87	22.22	30.9	15.00	37.86	31.0	18.72	56.00	31.1	51.41	47.06	31.2	46.37	42.80
31.8	7.12	22.08	31.9	15.13	37.52	32.0	18.63	55.67	32.1	51.24	46.81	32.2	46.18	42.68
11.93	-11.88		11.09	-11.05		18.49	-18.46		12.28	-12.24		9.80	-9.75	
1 ^h 42 ^m	9 ^h .88		5 ^h 46 ^m	38 ^h .12		7 ^h 17 ^m	0 ^h .79		9 ^h 9 ^m	14 ^h .21		10 ^h 59 ^m	56 ^h .00	
-85° 11'	57'' .70		-84° 49'	49'' .43		-86° 53'	53'' .55		-85° 19'	28'' .08		-84° 8'	11'' .87	

11.93	-11.88	11.09	-11.05	18.40	-18.46	12.28	-12.24	9.80	-0.75
1 ^h 42 ^m	9 ^s .88	5 ^h 46 ^m	38 ^s .12	7 ^h 17 ^m	0 ^s .79	9 ^h 9 ^m	14 ^s .21	10 ^h 59 ^m	56 ^s .00
-85° 11'	57'' .70	-84° 49'	49'' .43	-86° 53'	53'' .55	-85° 19'	28'' .08	-84° 8'	11'' .87

[Eph 15]

APPARENT PLACES OF CIRCUMPOLAR STARS

FOR THE UPPER TRANSIT AT WASHINGTON.

Octantis (G.). Mag. 5.6			31 Mensæ (G.). Mag. 6.2			7 Octantis (G.). Mag. 6.4			ζ Octantis. Mag. 5.4			η Octantis. Mag. 6.3		
Mean Solar Date.	Right Ascension.	Declination South.	Mean Solar Date.	Right Ascension.	Declination South.	Mean Solar Date.	Right Ascension.	Declination South.	Mean Solar Date.	Right Ascension.	Declination South.	Mean Solar Date.	Right Ascension.	Declination South.
July 1 42	h m	° ' "	July 5 46	h m	° ' "	July 7 16	h m	° ' "	July 9 8	h m	° ' "	July 10 59	h m	° ' "
0.8	6.87	22.22	0.9	15.09	37.86	1.0	18.72	56.00	1.1	51.41	47.06	1.2	46.37	42.80
1.8	7.12	22.08	1.9	15.13	37.52	2.0	18.63	55.67	2.1	51.24	46.81	2.2	46.18	42.68
2.8	7.37	21.96	2.9	15.17	37.20	3.0	18.55	55.36	3.1	51.09	46.57	3.2	46.01	42.55
3.8	7.60	21.85	3.9	15.22	36.89	4.0	18.48	55.08	4.1	50.94	46.35	4.2	45.84	42.43
4.8	7.82	21.74	4.9	15.27	36.61	5.0	18.42	54.80	5.1	50.81	46.13	5.2	45.69	42.33
5.8	8.04	21.64	5.9	15.31	36.34	6.0	18.35	54.53	6.1	50.67	45.93	6.2	45.53	42.23
6.8	8.24	21.52	6.9	15.33	36.06	7.0	18.26	54.28	7.1	50.53	45.74	7.2	45.38	42.14
7.8	8.45	21.39	7.9	15.36	35.78	8.0	18.16	54.02	8.1	50.37	45.55	8.2	45.21	42.05
8.8	8.66	21.26	8.9	15.39	35.49	9.0	18.05	53.76	9.1	50.21	45.35	9.2	45.04	41.97
9.8	8.87	21.13	9.9	15.41	35.18	10.0	17.94	53.47	10.1	50.04	45.13	10.2	44.86	41.89
10.8	9.11	20.99	10.9	15.44	34.87	11.0	17.83	53.16	11.1	49.86	44.91	11.2	44.68	41.80
11.8	9.35	20.85	11.9	15.46	34.54	11.9	17.72	52.84	12.1	49.68	44.66	12.2	44.48	41.68
12.8	9.61	20.71	12.9	15.51	34.19	12.9	17.62	52.51	13.1	49.51	44.40	13.2	44.29	41.55
13.8	9.88	20.59	13.9	15.58	33.83	13.9	17.56	52.17	14.1	49.35	44.12	14.1	44.09	41.40
14.8	10.16	20.49	14.9	15.66	33.49	14.9	17.53	51.81	15.1	49.20	43.83	15.1	43.90	41.23
15.8	10.44	20.42	15.9	15.76	33.16	15.9	17.51	51.47	16.1	49.07	43.53	16.1	43.72	41.04
16.8	10.71	20.37	16.9	15.85	32.86	16.9	17.52	51.14	17.1	48.96	43.23	17.1	43.56	40.84
17.8	10.96	20.34	17.9	15.95	32.57	17.9	17.55	50.84	18.1	48.86	42.95	18.1	43.42	40.65
18.7	11.19	20.32	18.9	16.06	32.31	18.9	17.58	50.55	19.1	48.78	42.70	19.1	43.29	40.47
19.7	11.42	20.30	19.9	16.15	32.07	19.9	17.60	50.28	20.1	48.70	42.47	20.1	43.16	40.31
20.7	11.62	20.26	20.9	16.23	31.83	20.9	17.61	50.03	21.1	48.61	42.24	21.1	43.04	40.16
21.7	11.83	20.20	21.9	16.29	31.58	21.9	17.60	49.78	22.0	48.50	42.02	22.1	42.91	40.03
22.7	12.03	20.13	22.9	16.35	31.31	22.9	17.56	49.52	23.0	48.38	41.80	23.1	42.76	39.91
23.7	12.25	20.04	23.9	16.42	31.02	23.9	17.51	49.22	24.0	48.25	41.56	24.1	42.60	39.77
24.7	12.50	19.95	24.9	16.49	30.71	24.9	17.48	48.90	25.0	48.12	41.29	25.1	42.43	39.62
25.7	12.77	19.87	25.9	16.57	30.39	25.9	17.46	48.57	26.0	47.98	40.99	26.1	42.25	39.44
26.7	13.05	19.82	26.9	16.68	30.06	26.9	17.47	48.22	27.0	47.86	40.67	27.1	42.07	39.23
27.7	13.33	19.81	27.9	16.81	29.75	27.9	17.53	47.87	28.0	47.77	40.35	28.1	41.91	39.00
28.7	13.62	19.81	28.9	16.95	29.45	28.9	17.60	47.53	29.0	47.69	40.02	29.1	41.76	38.75
29.7	13.90	19.84	29.9	17.11	29.19	29.9	17.71	47.21	30.0	47.64	39.70	30.1	41.64	38.50
30.7	14.15	19.88	30.9	17.27	28.94	30.9	17.83	46.91	31.0	47.61	39.39	31.1	41.52	38.25
31.7	14.39	19.93	31.9	17.42	28.71	31.9	17.96	46.63	32.0	47.57	39.10	32.1	41.42	38.01
11.92	-11.88	11.09	-11.04	18.48	-18.45	12.28	-12.24	9.80	-9.75					
h 42 ^m	9 ^s .88	5 ^h 46 ^m	38 ^s .12	7 ^h 17 ^m	0 ^s .79	9 ^h 9 ^m	14 ^s .21	10 ^h 59 ^m	56 ^s .00					
° 11'	57'' .70	-84° 49'	49'' .43	-86° 53'	53'' .55	-85° 19'	28'' .08	-84° 8'	11'' .87					

[Eph 13]

APPARENT PLACES OF CIRCUMPOLAR STARS
FOR THE UPPER TRANSIT AT WASHINGTON.

4 Octantis (G.). Mag. 5.6			31 Mensæ (G.). Mag. 6.2			7 Octantis (G.). Mag. 6.4			ζ Octantis. Mag. 5.4			7 Octantis Mag. 6.3	
Mean Solar Date.	Right Ascension.	Declination South.	Mean Solar Date.	Right Ascension.	Declination South.	Mean Solar Date.	Right Ascension.	Declination South.	Mean Solar Date.	Right Ascension.	Declination South.	Mean Solar Date.	Right Ascension.
Aug. 1 42 s	h m 14 42	° ' " -85 11 "	Aug. 5 46 s	h m 17 46	° ' " -84 49 "	Aug. 7 16 s	h m 17 16	° ' " -86 53 "	Aug. 9 8 s	h m 17 9	° ' " -85 19 "	Aug. 10 59 s	h m 10 59
0.7	14.39	19.93	0.9	17.42	28.71	0.9	17.06	46.63	1.0	47.57	39.10	1.1	41.42
1.7	14.60	19.99	1.9	17.56	28.50	1.9	18.08	46.37	2.0	47.54	38.83	2.1	41.32
2.7	14.82	20.03	2.9	17.69	28.29	2.9	18.19	46.11	3.0	47.51	38.57	3.1	41.22
3.7	15.03	20.08	3.9	17.82	28.07	3.9	18.29	45.85	4.0	47.48	38.30	4.1	41.12
4.7	15.25	20.11	4.9	17.96	27.85	4.9	18.38	45.59	5.0	47.43	38.03	5.1	41.01
5.7	15.47	20.13	5.9	18.08	27.62	5.9	18.46	45.33	6.0	47.38	37.77	6.1	40.90
6.7	15.71	20.14	6.9	18.20	27.37	6.9	18.54	45.05	7.0	47.31	37.49	7.1	40.78
7.7	15.95	20.16	7.9	18.33	27.12	7.9	18.62	44.74	8.0	47.26	37.19	8.1	40.65
8.7	16.20	20.18	8.9	18.48	26.86	8.9	18.71	44.43	9.0	47.19	36.88	9.1	40.52
9.7	16.46	20.22	9.9	18.64	26.60	9.9	18.83	44.11	9.9	47.15	36.55	10.1	40.30
10.7	16.73	20.27	10.9	18.80	26.33	10.9	18.97	43.79	10.9	47.11	36.20	11.1	40.27
11.7	17.00	20.34	11.9	18.99	26.08	11.9	19.13	43.47	11.9	47.10	35.86	12.1	40.16
12.7	17.27	20.44	12.9	19.19	25.85	12.9	19.33	43.16	12.9	47.10	35.52	13.1	40.06
13.7	17.52	20.57	13.8	19.39	25.64	13.9	19.54	42.88	13.9	47.12	35.19	14.1	39.98
14.7	17.74	20.71	14.8	19.59	25.47	14.9	19.77	42.62	14.9	47.16	34.88	15.1	39.92
15.7	17.95	20.85	15.8	19.78	25.32	15.9	19.99	42.39	15.9	47.20	34.59	16.1	39.87
16.7	18.15	20.98	16.8	19.95	25.19	16.9	20.19	42.17	16.9	47.24	34.32	17.1	39.82
17.7	18.33	21.10	17.8	20.12	25.04	17.9	20.37	41.97	17.9	47.27	34.07	18.1	39.77
18.7	18.52	21.19	18.8	20.27	24.89	18.9	20.53	41.76	18.9	47.29	33.82	19.0	39.71
19.7	18.71	21.26	19.8	20.42	24.72	19.9	20.67	41.52	19.9	47.29	33.56	20.0	39.63
20.7	18.93	21.34	20.8	20.57	24.52	20.9	20.81	41.26	20.9	47.28	33.28	21.0	39.53
21.7	19.16	21.42	21.8	20.74	24.30	21.9	20.98	40.98	21.9	47.27	32.98	22.0	39.44
22.7	19.40	21.52	22.8	20.93	24.08	22.9	21.16	40.69	22.9	47.26	32.65	23.0	39.35
23.7	19.64	21.64	23.8	21.14	23.87	23.9	21.38	40.40	23.9	47.28	32.32	24.0	39.26
24.6	19.90	21.79	24.8	21.35	23.68	24.9	21.63	40.12	24.9	47.33	31.98	25.0	39.19
25.6	20.14	21.97	25.8	21.58	23.52	25.9	21.91	39.85	25.9	47.40	31.64	26.0	39.15
26.6	20.35	22.17	26.8	21.81	23.38	26.9	22.20	39.61	26.9	47.48	31.31	27.0	39.11
27.6	20.55	22.37	27.8	22.05	23.26	27.9	22.50	39.40	27.9	47.58	31.00	28.0	39.09
28.6	20.74	22.58	28.8	22.28	23.17	28.9	22.80	39.20	28.9	47.69	30.72	29.0	39.08
29.6	20.91	22.78	29.8	22.49	23.08	29.9	23.09	39.02	29.9	47.79	30.46	30.0	39.08
30.6	21.08	22.98	30.8	22.71	23.00	30.9	23.36	38.83	30.9	47.89	30.20	31.0	39.07
31.6	21.24	23.17	31.8	22.91	22.91	31.9	23.62	38.66	31.9	47.97	29.95	32.0	39.05
11.92	-11.88		11.08	-11.04		18.46	-18.44		12.27	-12.23		9.80	
1 ^h 42 ^m	9 ^s .88		5 ^h 46 ^m	38 ^s .12		7 ^h 17 ^m	0 ^s .79		9 ^h 9 ^m	14 ^s .21		10 ^h 59 ^m	
-85° 11'	57'' .70		-84° 49'	49'' .43		-86° 53'	53'' .55		-85° 19'	28'' .08		-84° 8'	

[Eph 15]

APPARENT PLACES OF CIRCUMPOLAR STARS

FOR THE UPPER TRANSIT AT WASHINGTON.

α (G.). Mag. 5.6			β 1 Mensæ (G.). Mag. 6.2			γ 7 Octantis (G.). Mag. 6.4			δ 5 Octantis. Mag. 5.4			η 7 Octantis. Mag. 6.3		
Right Ascen- sion.	Declina- tion South.	Mean Solar Date.	Right Ascen- sion.	Declina- tion South.	Mean Solar Date.	Right Ascen- sion.	Declina- tion South.	Mean Solar Date.	Right Ascen- sion.	Declina- tion South.	Mean Solar Date.	Right Ascen- sion.	Declina- tion South.	Mean Solar Date.
m ° '			h m ° '			h m ° '			h m ° '			h m ° '		
42 -85 11		Sept.	5 46	-84 49	Sept.	7 16	-86 53	Sept.	9 8	-85 19	Sept.	10 59	-84 8	
24 23.17	0.8		22.91	22.91	0.9	23.62	38.66	0.9	47.97	29.95	1.0	39.05	29.75	
41 23.34	1.8		23.10	22.82	1.9	23.88	38.48	1.9	48.05	29.69	2.0	39.04	29.48	
58 23.51	2.8		23.30	22.71	2.9	24.13	38.29	2.9	48.12	29.42	3.0	39.01	29.21	
76 23.68	3.8		23.50	22.60	3.9	24.38	38.08	3.9	48.20	29.14	4.0	38.98	28.93	
95 23.85	4.8		23.69	22.48	4.9	24.63	37.87	4.9	48.27	28.85	5.0	38.94	28.63	
16 24.02	5.8		23.90	22.34	5.8	24.90	37.64	5.9	48.34	28.55	6.0	38.90	28.33	
37 24.21	6.8		24.13	22.22	6.8	25.18	37.41	6.9	48.42	28.24	6.9	38.88	28.01	
58 24.42	7.8		24.36	22.11	7.8	25.50	37.18	7.9	48.52	27.92	7.9	38.86	27.68	
78 24.66	8.8		24.61	22.01	8.8	25.84	36.97	8.9	48.65	27.61	8.9	38.85	27.34	
96 24.91	9.8		24.87	21.94	9.8	26.20	36.79	9.9	48.80	27.31	9.9	38.87	26.99	
12 25.18	10.8		25.12	21.90	10.8	26.58	36.63	10.9	48.96	27.03	10.9	38.90	26.65	
27 25.47	11.8		25.37	21.89	11.8	26.94	36.50	11.9	49.13	26.77	11.9	38.95	26.34	
39 25.74	12.8		25.60	21.90	12.8	27.30	36.39	12.9	49.30	26.54	12.9	39.00	26.05	
50 25.98	13.8		25.82	21.90	13.8	27.63	36.29	13.9	49.46	26.33	13.9	39.05	25.77	
61 26.22	14.8		26.02	21.91	14.8	27.94	36.19	14.9	49.60	26.13	14.9	39.09	25.51	
72 26.44	15.8		26.22	21.90	15.8	28.23	36.08	15.9	49.72	25.93	15.9	39.12	25.26	
84 26.64	16.8		26.41	21.87	16.8	28.51	35.95	16.9	49.84	25.71	16.9	39.13	25.01	
97 26.85	17.8		26.61	21.82	17.8	28.80	35.80	17.9	49.95	25.48	17.9	39.14	24.74	
12 27.06	18.8		26.83	21.76	18.8	29.10	35.63	18.9	50.07	25.22	18.9	39.15	24.44	
29 27.29	19.7		27.07	21.71	19.8	29.44	35.46	19.9	50.21	24.95	19.9	39.17	24.13	
45 27.56	20.7		27.32	21.67	20.8	29.80	35.30	20.9	50.37	24.67	20.9	39.20	23.79	
60 27.85	21.7		27.58	21.65	21.8	30.19	35.15	21.9	50.55	24.39	21.9	39.24	23.45	
74 28.15	22.7		27.84	21.67	22.8	30.60	35.04	22.9	50.75	24.13	22.9	39.31	23.12	
85 28.47	23.7		28.10	21.71	23.8	31.02	34.95	23.9	50.96	23.89	23.9	39.39	22.80	
94 28.80	24.7		28.36	21.78	24.8	31.44	34.88	24.9	51.18	23.68	24.9	39.49	22.48	
01 29.12	25.7		28.60	21.86	25.8	31.85	34.83	25.9	51.40	23.49	25.9	39.58	22.19	
08 29.44	26.7		28.83	21.94	26.8	32.23	34.79	26.9	51.61	23.31	26.9	39.68	21.91	
15 29.74	27.7		29.05	22.02	27.8	32.60	34.75	27.9	51.81	23.14	27.9	39.78	21.65	
21 30.02	28.7		29.27	22.10	28.8	32.96	34.72	28.9	52.01	22.97	28.9	39.86	21.40	
27 30.28	29.7		29.48	22.16	29.8	33.32	34.67	29.9	52.20	22.81	29.9	39.95	21.15	
35 30.55	30.7		29.68	22.22	30.8	33.66	34.62	30.9	52.39	22.64	30.9	40.03	20.89	
43 30.82	31.7		29.89	22.27	31.8	34.00	34.55	31.9	52.57	22.44	31.9	40.10	20.63	
-11.89	11.08	-11.04	18.45	-18.42	12.27	-12.23	9.80	-9.74						
9°.88	5 ^h 46 ^m	38°.12	7 ^h 17 ^m	0°.79	9 ^h 9 ^m	14°.21	10 ^h 59 ^m	56°.00						
57° 70'	-84° 49'	49° 43'	-86° 53'	53° 55'	-85° 19'	28° 08'	-84° 8'	11° 87'						

[Eph 15]

APPARENT PLACES OF CIRCUMPOLAR STARS
FOR THE UPPER TRANSIT AT WASHINGTON.

4 Octantis (G.). Mag. 5.6			31 Mensæ (G.). Mag. 6.2			7 Octantis (G.). Mag. 6.4			ζ Octantis. Mag. 5.4			η Octantis. Mag. 6.3	
Mean Solar Date.	Right Ascension.	Declination South.	Mean Solar Date.	Right Ascension.	Declination South.	Mean Solar Date.	Right Ascension.	Declination South.	Mean Solar Date.	Right Ascension.	Declination South.	Mean Solar Date.	Right Ascension.
Oct.	h m 1 42	° ' " -85 11 "	Oct.	h m 5 46	° ' " -84 49 "	Oct.	h m 7 16	° ' " -86 53 "	Oct.	h m 9 8	° ' " -85 19 "	Oct.	h m 10 59
0.5	25.35	30.55	0.7	29.68	22.22	0.8	33.66	34.62	0.9	52.39	22.63	0.9	40.03
1.5	25.43	30.82	1.7	29.89	22.27	1.8	34.00	34.55	1.9	52.57	22.44	1.9	40.10
2.5	25.52	31.09	2.7	30.11	22.31	2.8	34.35	34.49	2.9	52.75	22.24	2.9	40.17
3.5	25.60	31.36	3.7	30.33	22.35	3.8	34.72	34.42	3.8	52.94	22.04	3.9	40.25
4.5	25.70	31.65	4.7	30.57	22.40	4.8	35.11	34.35	4.8	53.15	21.83	4.9	40.32
5.5	25.80	31.96	5.7	30.81	22.47	5.8	35.51	34.29	5.8	53.36	21.62	5.9	40.42
6.5	25.88	32.29	6.7	31.07	22.56	6.8	35.93	34.24	6.8	53.60	21.43	6.9	40.53
7.5	25.93	32.64	7.7	31.32	22.68	7.8	36.37	34.23	7.8	53.86	21.25	7.9	40.66
8.5	25.96	33.00	8.7	31.57	22.83	8.8	36.81	34.24	8.8	54.12	21.10	8.9	40.81
9.5	25.98	33.36	9.7	31.79	23.00	9.8	37.24	34.28	9.8	54.39	20.98	9.9	40.96
10.5	25.97	33.69	10.7	32.00	23.18	10.8	37.64	34.34	10.8	54.64	20.88	10.9	41.11
11.5	25.96	34.00	11.7	32.20	23.35	11.7	38.02	34.40	11.8	54.89	20.80	11.9	41.26
12.5	25.93	34.29	12.7	32.38	23.52	12.7	38.36	34.47	12.8	55.12	20.73	12.9	41.40
13.5	25.92	34.56	13.7	32.55	23.66	13.7	38.69	34.51	13.8	55.33	20.65	13.9	41.53
14.5	25.93	34.82	14.7	32.73	23.78	14.7	39.02	34.53	14.8	55.53	20.55	14.9	41.64
15.5	25.95	35.09	15.7	32.92	23.89	15.7	39.36	34.55	15.8	55.74	20.43	15.9	41.75
16.5	25.98	35.37	16.7	33.13	24.00	16.7	39.72	34.55	16.8	55.95	20.30	16.9	41.86
17.5	26.02	35.67	17.7	33.35	24.13	17.7	40.11	34.55	17.8	56.18	20.16	17.9	41.98
18.5	26.06	36.00	18.7	33.57	24.27	18.7	40.52	34.57	18.8	56.43	20.02	18.9	42.12
19.5	26.08	36.34	19.7	33.80	24.43	19.7	40.95	34.61	19.8	56.70	19.90	19.9	42.28
20.5	26.07	36.70	20.7	34.04	24.63	20.7	41.39	34.68	20.8	56.99	19.80	20.9	42.46
21.5	26.04	37.07	21.7	34.27	24.85	21.7	41.83	34.78	21.8	57.29	19.72	21.9	42.64
22.5	25.99	37.43	22.7	34.47	25.09	22.7	42.25	34.88	22.8	57.59	19.67	22.9	42.83
23.5	25.93	37.77	23.7	34.66	25.34	23.7	42.66	35.01	23.8	57.87	19.64	23.9	43.03
24.5	25.86	38.10	24.7	34.84	25.59	24.7	43.04	35.15	24.8	58.15	19.63	24.9	43.22
25.5	25.79	38.41	25.6	35.02	25.83	25.7	43.41	35.29	25.8	58.42	19.61	25.9	43.40
26.5	25.72	38.71	26.6	35.18	26.05	26.7	43.77	35.42	26.8	58.67	19.60	26.9	43.58
27.5	25.66	39.00	27.6	35.34	26.27	27.7	44.11	35.54	27.8	58.92	19.58	27.9	43.75
28.5	25.60	39.28	28.6	35.49	26.48	28.7	44.44	35.65	28.8	59.16	19.56	28.9	43.91
29.5	25.56	39.56	29.6	35.65	26.68	29.7	44.77	35.76	29.8	59.39	19.53	29.9	44.07
30.5	25.52	39.84	30.6	35.82	26.87	30.7	45.12	35.86	30.8	59.64	19.49	30.9	44.22
31.5	25.47	40.14	31.6	35.99	27.08	31.7	45.48	35.96	31.8	59.89	19.44	31.8	44.44
11.93 1 ^h 42 ^m	-11.89 9° 88'		11.08 5 ^h 46 ^m	-11.04 38° 12'		18.45 7 ^h 17 ^m	-18.42 0° 79'		12.26 9 ^h 9 ^m	-12.22 14° 21'		9.79 10 ^h 59 ^m	
-85° 11'	57° 70'		-84° 49'	49° 43'		-86° 53'	53° 55'		-85° 19'	28° 08'		-84° 8'	

[Eph 15]

APPARENT PLACES OF CIRCUMPOLAR STARS
FOR THE UPPER TRANSIT AT WASHINGTON.

Octantis (G.). Mag. 5.6			31 Mensæ (G.). Mag. 6.2			7 Octantis (G.). Mag. 6.4			ζ Octantis. Mag. 5.4			γ Octantis. Mag. 6.3		
Mean Solar Date.	Right Ascension.	Declination South.	Mean Solar Date.	Right Ascension.	Declination South.	Mean Solar Date.	Right Ascension.	Declination South.	Mean Solar Date.	Right Ascension.	Declination South.	Mean Solar Date.	Right Ascension.	Declination South.
Nov. 5 46	85 11	84 49	Nov. 5 46	85 11	84 49	Nov. 7 16	86 53	86 53	Nov. 9 8	85 19	85 19	Nov. 10 59	84 8	84 8
5 25.47	40.14	0.6	5 25.47	40.14	0.6	5 25.47	40.14	0.6	5 25.47	40.14	0.6	5 25.47	40.14	0.6
5 25.43	40.45	1.6	5 25.43	40.45	1.6	5 25.43	40.45	1.6	5 25.43	40.45	1.6	5 25.43	40.45	1.6
5 25.38	40.78	2.6	5 25.38	40.78	2.6	5 25.38	40.78	2.6	5 25.38	40.78	2.6	5 25.38	40.78	2.6
5 25.31	41.11	3.6	5 25.31	41.11	3.6	5 25.31	41.11	3.6	5 25.31	41.11	3.6	5 25.31	41.11	3.6
5 25.22	41.45	4.6	5 25.22	41.45	4.6	5 25.22	41.45	4.6	5 25.22	41.45	4.6	5 25.22	41.45	4.6
4 25.11	41.80	5.6	4 25.11	41.80	5.6	4 25.11	41.80	5.6	4 25.11	41.80	5.6	4 25.11	41.80	5.6
4 24.98	42.13	6.6	4 24.98	42.13	6.6	4 24.98	42.13	6.6	4 24.98	42.13	6.6	4 24.98	42.13	6.6
4 24.83	42.42	7.6	4 24.83	42.42	7.6	4 24.83	42.42	7.6	4 24.83	42.42	7.6	4 24.83	42.42	7.6
4 24.68	42.69	8.6	4 24.68	42.69	8.6	4 24.68	42.69	8.6	4 24.68	42.69	8.6	4 24.68	42.69	8.6
4 24.54	42.94	9.6	4 24.54	42.94	9.6	4 24.54	42.94	9.6	4 24.54	42.94	9.6	4 24.54	42.94	9.6
4 24.40	43.18	10.6	4 24.40	43.18	10.6	4 24.40	43.18	10.6	4 24.40	43.18	10.6	4 24.40	43.18	10.6
4 24.28	43.41	11.6	4 24.28	43.41	11.6	4 24.28	43.41	11.6	4 24.28	43.41	11.6	4 24.28	43.41	11.6
4 24.17	43.64	12.6	4 24.17	43.64	12.6	4 24.17	43.64	12.6	4 24.17	43.64	12.6	4 24.17	43.64	12.6
4 24.08	43.90	13.6	4 24.08	43.90	13.6	4 24.08	43.90	13.6	4 24.08	43.90	13.6	4 24.08	43.90	13.6
4 23.99	44.18	14.6	4 23.99	44.18	14.6	4 23.99	44.18	14.6	4 23.99	44.18	14.6	4 23.99	44.18	14.6
4 23.88	44.47	15.6	4 23.88	44.47	15.6	4 23.88	44.47	15.6	4 23.88	44.47	15.6	4 23.88	44.47	15.6
4 23.75	44.78	16.6	4 23.75	44.78	16.6	4 23.75	44.78	16.6	4 23.75	44.78	16.6	4 23.75	44.78	16.6
4 23.60	45.10	17.6	4 23.60	45.10	17.6	4 23.60	45.10	17.6	4 23.60	45.10	17.6	4 23.60	45.10	17.6
4 23.43	45.40	18.6	4 23.43	45.40	18.6	4 23.43	45.40	18.6	4 23.43	45.40	18.6	4 23.43	45.40	18.6
4 23.24	45.70	19.6	4 23.24	45.70	19.6	4 23.24	45.70	19.6	4 23.24	45.70	19.6	4 23.24	45.70	19.6
4 23.05	45.97	20.6	4 23.05	45.97	20.6	4 23.05	45.97	20.6	4 23.05	45.97	20.6	4 23.05	45.97	20.6
4 22.85	46.22	21.6	4 22.85	46.22	21.6	4 22.85	46.22	21.6	4 22.85	46.22	21.6	4 22.85	46.22	21.6
4 22.66	46.45	22.6	4 22.66	46.45	22.6	4 22.66	46.45	22.6	4 22.66	46.45	22.6	4 22.66	46.45	22.6
4 22.48	46.67	23.6	4 22.48	46.67	23.6	4 22.48	46.67	23.6	4 22.48	46.67	23.6	4 22.48	46.67	23.6
4 22.30	46.88	24.6	4 22.30	46.88	24.6	4 22.30	46.88	24.6	4 22.30	46.88	24.6	4 22.30	46.88	24.6
4 22.12	47.08	25.6	4 22.12	47.08	25.6	4 22.12	47.08	25.6	4 22.12	47.08	25.6	4 22.12	47.08	25.6
4 21.96	47.28	26.6	4 21.96	47.28	26.6	4 21.96	47.28	26.6	4 21.96	47.28	26.6	4 21.96	47.28	26.6
4 21.81	47.48	27.6	4 21.81	47.48	27.6	4 21.81	47.48	27.6	4 21.81	47.48	27.6	4 21.81	47.48	27.6
4 21.65	47.70	28.6	4 21.65	47.70	28.6	4 21.65	47.70	28.6	4 21.65	47.70	28.6	4 21.65	47.70	28.6
4 21.48	47.94	29.6	4 21.48	47.94	29.6	4 21.48	47.94	29.6	4 21.48	47.94	29.6	4 21.48	47.94	29.6
4 21.31	48.18	30.6	4 21.31	48.18	30.6	4 21.31	48.18	30.6	4 21.31	48.18	30.6	4 21.31	48.18	30.6
4 21.11	48.43	31.5	4 21.11	48.43	31.5	4 21.11	48.43	31.5	4 21.11	48.43	31.5	4 21.11	48.43	31.5
11.09	11.09	11.09	11.09	11.09	11.09	11.09	11.09	11.09	11.09	11.09	11.09	11.09	11.09	11.09
9 ^h 46 ^m	9 ^h 46 ^m	9 ^h 46 ^m	9 ^h 46 ^m	9 ^h 46 ^m	9 ^h 46 ^m	9 ^h 46 ^m	9 ^h 46 ^m	9 ^h 46 ^m	9 ^h 46 ^m	9 ^h 46 ^m	9 ^h 46 ^m	9 ^h 46 ^m	9 ^h 46 ^m	9 ^h 46 ^m
57 ^m 70 ^s	57 ^m 70 ^s	57 ^m 70 ^s	57 ^m 70 ^s	57 ^m 70 ^s	57 ^m 70 ^s	57 ^m 70 ^s	57 ^m 70 ^s	57 ^m 70 ^s	57 ^m 70 ^s	57 ^m 70 ^s	57 ^m 70 ^s	57 ^m 70 ^s	57 ^m 70 ^s	57 ^m 70 ^s
84° 49'	84° 49'	84° 49'	84° 49'	84° 49'	84° 49'	84° 49'	84° 49'	84° 49'	84° 49'	84° 49'	84° 49'	84° 49'	84° 49'	84° 49'
49° 43'	49° 43'	49° 43'	49° 43'	49° 43'	49° 43'	49° 43'	49° 43'	49° 43'	49° 43'	49° 43'	49° 43'	49° 43'	49° 43'	49° 43'
18.46	18.46	18.46	18.46	18.46	18.46	18.46	18.46	18.46	18.46	18.46	18.46	18.46	18.46	18.46
17 ^m	17 ^m	17 ^m	17 ^m	17 ^m	17 ^m	17 ^m	17 ^m	17 ^m	17 ^m	17 ^m	17 ^m	17 ^m	17 ^m	17 ^m
53'	53'	53'	53'	53'	53'	53'	53'	53'	53'	53'	53'	53'	53'	53'
53° 55'	53° 55'	53° 55'	53° 55'	53° 55'	53° 55'	53° 55'	53° 55'	53° 55'	53° 55'	53° 55'	53° 55'	53° 55'	53° 55'	53° 55'
12.26	12.26	12.26	12.26	12.26	12.26	12.26	12.26	12.26	12.26	12.26	12.26	12.26	12.26	12.26
9 ^h 9 ^m	9 ^h 9 ^m	9 ^h 9 ^m	9 ^h 9 ^m	9 ^h 9 ^m	9 ^h 9 ^m	9 ^h 9 ^m	9 ^h 9 ^m	9 ^h 9 ^m	9 ^h 9 ^m	9 ^h 9 ^m	9 ^h 9 ^m	9 ^h 9 ^m	9 ^h 9 ^m	9 ^h 9 ^m
14° 21'	14° 21'	14° 21'	14° 21'	14° 21'	14° 21'	14° 21'	14° 21'	14° 21'	14° 21'	14° 21'	14° 21'	14° 21'	14° 21'	14° 21'
28° 08'	28° 08'	28° 08'	28° 08'	28° 08'	28° 08'	28° 08'	28° 08'	28° 08'	28° 08'	28° 08'	28° 08'	28° 08'	28° 08'	28° 08'
84° 8'	84° 8'	84° 8'	84° 8'	84° 8'	84° 8'	84° 8'	84° 8'	84° 8'	84° 8'	84° 8'	84° 8'	84° 8'	84° 8'	84° 8'
11° 87'	11° 87'	11° 87'	11° 87'	11° 87'	11° 87'	11° 87'	11° 87'	11° 87'	11° 87'	11° 87'	11° 87'	11° 87'	11° 87'	11° 87'

APPARENT PLACES OF CIRCUMPOLAR STARS

FOR THE UPPER TRANSIT AT WASHINGTON.

4 Octantis (G.). Mag. 5.6			31 Mensæ (G.). Mag. 6.2			7 Octantis (G.). Mag. 6.4			ζ Octantis. Mag. 5.4			7 Octant Mag. 6.	
Mean Solar Date.	Right Ascension.	Declination South.	Mean Solar Date.	Right Ascension.	Declination South.	Mean Solar Date.	Right Ascension.	Declination South.	Mean Solar Date.	Right Ascension.	Declination South.	Mean Solar Date.	Right Ascension.
Dec.	h m 1 42	° ' 85 11	Dec.	h m 5 46	° ' 84 49	Dec.	h m 7 16	° ' 86 53	Dec.	h m 9 9	° ' 85 19	Dec.	h m 10 59
0.4	21.31	48.18	0.6	39.32	36.06	0.6	54.51	42.61	0.7	7.80	22.10	0.8	50.80
1.4	21.11	48.43	1.5	39.39	36.40	1.6	54.77	42.91	1.7	8.07	22.27	1.8	51.05
2.4	20.90	48.68	2.5	39.44	36.79	2.6	55.03	43.23	2.7	8.35	22.47	2.8	51.30
3.4	20.66	48.90	3.5	39.48	37.18	3.6	55.26	43.58	3.7	8.62	22.70	3.8	51.56
4.4	20.41	49.11	4.5	39.50	37.58	4.6	55.46	43.94	4.7	8.87	22.95	4.8	51.81
5.4	20.15	49.29	5.5	39.49	37.96	5.6	55.62	44.30	5.7	9.10	23.21	5.8	52.06
6.4	19.89	49.44	6.5	39.47	38.33	6.6	55.75	44.66	6.7	9.31	23.48	6.8	52.29
7.4	19.65	49.57	7.5	39.44	38.68	7.6	55.85	44.99	7.7	9.51	23.74	7.7	52.50
8.4	19.43	49.68	8.5	39.42	38.99	8.6	55.95	45.30	8.7	9.69	23.99	8.7	52.70
9.4	19.22	49.79	9.5	39.40	39.29	9.6	56.06	45.59	9.7	9.86	24.22	9.7	52.89
10.4	19.02	49.92	10.5	39.39	39.59	10.6	56.18	45.87	10.7	10.04	24.43	10.7	53.09
11.3	18.83	50.08	11.5	39.39	39.89	11.6	56.32	46.16	11.7	10.24	24.64	11.7	53.29
12.3	18.63	50.24	12.5	39.41	40.21	12.6	56.49	46.45	12.7	10.45	24.84	12.7	53.50
13.3	18.41	50.41	13.5	39.42	40.56	13.6	56.67	46.75	13.7	10.68	25.06	13.7	53.73
14.3	18.17	50.59	14.5	39.43	40.92	14.6	56.84	47.09	14.7	10.92	25.30	14.7	53.98
15.3	17.92	50.76	15.5	39.44	41.31	15.6	57.01	47.45	15.7	11.16	25.56	15.7	54.22
16.3	17.66	50.93	16.5	39.42	41.70	16.6	57.16	47.82	16.6	11.39	25.85	16.7	54.47
17.3	17.38	51.07	17.5	39.38	42.09	17.6	57.28	48.20	17.6	11.61	26.16	17.7	54.72
18.3	17.10	51.19	18.5	39.33	42.47	18.6	57.37	48.59	18.6	11.81	26.47	18.7	54.95
19.3	16.83	51.29	19.5	39.28	42.84	19.6	57.44	48.97	19.6	11.99	26.79	19.7	55.18
20.3	16.55	51.37	20.5	39.21	43.20	20.6	57.49	49.34	20.6	12.15	27.10	20.7	55.40
21.3	16.28	51.44	21.5	39.13	43.54	21.6	57.52	49.69	21.6	12.31	27.40	21.7	55.60
22.3	16.03	51.50	22.5	39.05	43.86	22.6	57.55	50.03	22.6	12.46	27.70	22.7	55.79
23.3	15.79	51.55	23.5	38.98	44.17	23.6	57.56	50.36	23.6	12.60	27.99	23.7	55.97
24.3	15.56	51.61	24.5	38.91	44.47	24.5	57.58	50.68	24.6	12.73	28.27	24.7	56.16
25.3	15.33	51.68	25.5	38.84	44.78	25.5	57.63	50.99	25.6	12.88	28.54	25.7	56.34
26.3	15.10	51.75	26.5	38.79	45.10	26.5	57.67	51.31	26.6	13.04	28.81	26.7	56.54
27.3	14.86	51.83	27.5	38.74	45.42	27.5	57.73	51.64	27.6	13.21	29.09	27.7	56.74
28.3	14.61	51.93	28.5	38.68	45.76	28.5	57.80	52.00	28.6	13.38	29.39	28.7	56.95
29.3	14.34	52.02	29.5	38.62	46.13	29.5	57.86	52.37	29.6	13.56	29.71	29.7	57.18
30.3	14.05	52.10	30.5	38.54	46.51	30.5	57.90	52.76	30.6	13.74	30.06	30.7	57.41
31.3	13.75	52.16	31.5	38.44	46.89	31.5	57.91	53.17	31.6	13.89	30.42	31.7	57.64
11.94	-11.90		11.09	-11.05		18.47	-18.44		12.27	-12.23		9.79	
1 ^h 42 ^m	9 ^s .88		5 ^h 46 ^m	38 ^s .12		7 ^h 17 ^m	0 ^s .79		9 ^h 9 ^m	14 ^s .21		10 ^h 59 ^m	
-85° 11'	57'' .70		-84° 49'	49'' .43		-86° 53'	53'' .55		-85° 19'	28'' .08		-84° 8'	

[Eph 15]

APPARENT PLACES OF CIRCUMPOLAR STARS
FOR THE UPPER TRANSIT AT WASHINGTON.

♌ Octantis. Mag. 5.4			♋ Octantis. Mag. 4.1			♊ Octantis. Mag. 5.2			♏ Octantis. Mag. 5.5			♍ Octantis. Mag. 5.7		
mag.	Right Ascension.	Declination South.	Mean Solar Date.	Right Ascension.	Declination South.	Mean Solar Date.	Right Ascension.	Declination South.	Mean Solar Date.	Right Ascension.	Declination South.	Mean Solar Date.	Right Ascension.	Declination South.
m.	h m 12 45	° ' 84 39	Jan.	h m 14 13	° ' 83 16	Jan.	h m 18 4	° ' 87 39	Jan.	h m 19 23	° ' 89 13	Jan.	h m 22 15	° ' 86 24
1.8	50.65	27.92	0.8	2.81	36.16	0.9	34.16	56.88	1.0	22.88	52.84	1.1	40.53	19.84
1.8	50.90	28.06	1.8	3.01	36.16	1.9	34.45	56.59	2.0	23.18	52.51	2.1	40.35	19.56
1.7	51.13	28.18	2.8	3.21	36.17	2.9	34.73	56.31	3.0	23.49	52.18	3.1	40.17	19.30
1.7	51.36	28.30	3.8	3.40	36.17	3.9	34.98	56.04	4.0	23.74	51.87	4.1	39.99	19.05
4.7	51.59	28.40	4.8	3.59	36.16	4.9	35.22	55.76	5.0	23.91	51.56	5.1	39.80	18.81
5.7	51.82	28.49	5.8	3.78	36.14	5.9	35.44	55.47	6.0	24.04	51.25	6.1	39.59	18.58
6.7	52.06	28.57	6.8	3.98	36.10	6.9	35.65	55.17	7.0	24.11	50.90	7.1	39.36	18.33
7.7	52.32	28.65	7.8	4.19	36.05	7.9	35.88	54.84	8.0	24.17	50.55	8.1	39.12	18.06
8.7	52.60	28.75	8.8	4.41	36.01	8.9	36.15	54.49	9.0	24.32	50.16	9.1	38.88	17.76
9.7	52.89	28.87	9.8	4.65	35.99	9.9	36.46	54.13	10.0	24.59	49.76	10.1	38.64	17.44
10.7	53.18	29.01	10.8	4.90	35.98	10.9	36.80	53.78	11.0	24.97	49.35	11.1	38.41	17.10
11.7	53.46	29.18	11.8	5.15	36.00	11.9	37.20	53.44	11.9	25.51	48.95	12.1	38.21	16.74
12.7	53.73	29.38	12.8	5.40	36.06	12.9	37.63	53.12	12.9	26.18	48.56	13.1	38.05	16.37
13.7	53.99	29.60	13.8	5.63	36.14	13.9	38.07	52.83	13.9	26.94	48.21	14.1	37.92	16.02
14.7	54.22	29.81	14.8	5.85	36.23	14.9	38.50	52.57	14.9	27.69	47.89	15.1	37.81	15.68
15.7	54.45	30.02	15.8	6.06	36.32	15.9	38.91	52.33	15.9	28.42	47.56	16.1	37.70	15.36
16.7	54.66	30.21	16.8	6.26	36.39	16.9	39.28	52.09	16.9	29.08	47.27	17.1	37.59	15.06
17.7	54.88	30.39	17.8	6.45	36.46	17.9	39.64	51.85	17.9	29.64	46.96	18.1	37.47	14.78
18.7	55.09	30.55	18.8	6.64	36.50	18.9	39.97	51.59	18.9	30.15	46.64	19.1	37.33	14.49
19.7	55.32	30.71	19.8	6.85	36.54	19.9	40.31	51.32	19.9	30.61	46.32	20.1	37.17	14.19
20.7	55.56	30.87	20.8	7.06	36.57	20.9	40.65	51.04	20.9	31.09	45.98	21.1	37.00	13.88
21.7	55.82	31.04	21.8	7.28	36.61	21.9	41.02	50.74	21.9	31.60	45.63	22.1	36.83	13.55
22.7	56.08	31.22	22.8	7.51	36.65	22.9	41.41	50.43	22.9	32.19	45.26	23.1	36.66	13.20
23.7	56.34	31.42	23.8	7.74	36.71	23.9	41.84	50.13	23.9	32.87	44.88	24.1	36.51	12.84
24.7	56.59	31.64	24.8	7.98	36.79	24.9	42.29	49.83	24.9	33.64	44.50	25.1	36.37	12.46
25.7	56.85	31.88	25.7	8.22	36.89	25.9	42.78	49.54	25.9	34.54	44.13	26.1	36.25	12.08
26.7	57.09	32.14	26.7	8.45	37.02	26.9	43.29	49.28	26.9	35.53	43.76	27.1	36.15	11.68
27.7	57.33	32.41	27.7	8.68	37.15	27.9	43.81	49.03	27.9	36.58	43.43	28.1	36.08	11.30
28.7	57.55	32.69	28.7	8.91	37.31	28.9	44.34	48.81	28.9	37.69	43.10	29.1	36.03	10.92
29.7	57.75	32.97	29.7	9.11	37.47	29.9	44.86	48.60	29.9	38.80	42.81	30.1	35.99	10.56
30.7	57.94	33.24	30.7	9.31	37.64	30.9	45.35	48.41	30.9	39.86	42.51	31.1	35.96	10.22
31.7	58.13	33.50	31.7	9.50	37.79	31.9	45.82	48.22	31.9	40.87	42.24	32.1	35.92	9.88
0.74	-10.69	8.54	-8.48	24.54	-24.52	74.40	-74.39	15.95	-15.91					
h 45 ^m	55°.22	14 ^h 13 ^m	9°.28	18 ^h 5 ^m	0°.43	19 ^h 24 ^m	31°.66	22 ^h 15 ^m	43°.98					
° 39'	43''.10	-83° 16'	47''.50	-87° 39'	52''.55	-89° 13'	43''.28	-86° 24'	3''.31					

[Rph 15]

**APPARENT PLACES OF CIRCUMPOLAR STARS
FOR THE UPPER TRANSIT AT WASHINGTON.**

♄ Octantis. Mag. 5.4			♋ Octantis. Mag. 4.1			♊ Octantis. Mag. 5.2			♏ Octantis. Mag. 5.5			♐ Oct. Mag.	
Mean Solar Date.	Right Ascension.	Declination South.	Mean Solar Date.	Right Ascension.	Declination South.	Mean Solar Date.	Right Ascension.	Declination South.	Mean Solar Date.	Right Ascension.	Declination South.	Mean Solar Date.	Right Ascension.
	h m	° '		h m	° '		h m	° '		h m	° '		h
Feb. 12 45	84 39		Feb. 14 13	83 16		Feb. 18 4	87 39		Feb. 19 23	89 13		Feb. 22 1	
	s	"		s	"		s	"		s	"		s
0.7	58.13	33.50	0.7	9.50	37.79	0.9	45.82	48.22	0.9	40.87	42.24	1.1	35.5
1.7	58.32	33.74	1.7	9.69	37.93	1.9	46.28	48.02	1.9	41.81	41.96	2.1	35.5
2.7	58.51	33.98	2.7	9.88	38.05	2.9	46.72	47.80	2.9	42.69	41.68	3.1	35.5
3.7	58.71	34.21	3.7	10.09	38.17	3.9	47.17	47.57	3.9	43.53	41.36	4.1	35.5
4.7	58.93	34.44	4.7	10.30	38.28	4.9	47.64	47.32	4.9	44.40	41.02	5.1	35.6
5.7	59.17	34.68	5.7	10.53	38.40	5.9	48.13	47.05	5.9	45.35	40.67	6.1	35.5
6.7	59.40	34.95	6.7	10.76	38.54	6.9	48.67	46.79	6.9	46.45	40.29	7.0	35.4
7.7	59.64	35.25	7.7	11.00	38.70	7.9	49.26	46.54	7.9	47.68	39.94	8.0	35.3
8.6	59.87	35.58	8.7	11.24	38.89	8.9	49.87	46.31	8.9	49.04	39.59	9.0	35.3
9.6	60.08	35.93	9.7	11.47	39.11	9.9	50.51	46.11	9.9	50.49	39.28	10.0	35.3
10.6	60.27	36.28	10.7	11.68	39.34	10.9	51.13	45.94	10.9	51.97	38.98	11.0	35.3
11.6	60.43	36.63	11.7	11.87	39.58	11.9	51.74	45.79	11.9	53.43	38.72	12.0	35.4
12.6	60.59	36.96	12.7	12.06	39.82	12.9	52.32	45.65	12.9	54.82	38.46	13.0	35.4
13.6	60.75	37.27	13.7	12.23	40.04	13.9	52.87	45.52	13.9	56.13	38.24	14.0	35.5
14.6	60.90	37.56	14.7	12.40	40.24	14.9	53.39	45.37	14.9	57.36	37.99	15.0	35.5
15.6	61.06	37.85	15.7	12.58	40.43	15.9	53.91	45.22	15.9	58.55	37.74	16.0	35.5
16.6	61.23	38.12	16.7	12.77	40.62	16.8	54.42	45.05	16.9	59.69	37.46	17.0	35.5
17.6	61.41	38.40	17.7	12.97	40.79	17.8	54.95	44.86	17.9	60.86	37.17	18.0	35.4
18.6	61.59	38.70	18.7	13.17	40.97	18.8	55.49	44.66	18.9	62.08	36.87	19.0	35.4
19.6	61.79	39.01	19.7	13.37	41.17	19.8	56.08	44.46	19.9	63.37	36.57	20.0	35.4
20.6	61.98	39.34	20.7	13.58	41.38	20.8	56.68	44.27	20.9	64.74	36.26	21.0	35.4
21.6	62.16	39.68	21.7	13.79	41.61	21.8	57.31	44.09	21.9	66.22	35.96	22.0	35.4
22.6	62.34	40.04	22.7	14.00	41.86	22.8	57.96	43.93	22.9	67.80	35.67	23.0	35.4
23.6	62.50	40.41	23.7	14.21	42.13	23.8	58.64	43.79	23.9	69.45	35.41	24.0	35.4
24.6	62.65	40.79	24.7	14.40	42.41	24.8	59.31	43.67	24.9	71.14	35.16	24.9	35.4
25.6	62.78	41.17	25.7	14.57	42.70	25.8	59.97	43.57	25.9	72.85	34.93	25.9	35.4
26.6	62.89	41.55	26.7	14.74	42.99	26.8	60.61	43.49	26.9	74.55	34.73	26.9	35.4
27.6	63.01	41.91	27.7	14.90	43.28	27.8	61.23	43.42	27.9	76.16	34.53	27.9	36.4
28.6	63.12	42.25	28.7	15.05	43.55	28.8	61.82	43.35	28.9	77.69	34.33	28.9	36.4
29.6	63.23	42.59	29.7	15.21	43.80	29.8	62.40	43.27	29.9	79.16	34.14	29.9	36.4
30.6	63.35	42.91	30.6	15.38	44.04	30.8	62.96	43.17	30.9	80.57	33.92	30.9	36.4
31.6	63.49	43.22	31.6	15.54	44.27	31.8	63.53	43.04	31.9	81.96	33.70	31.9	36.4
10.74	-10.70		8.54	-8.48		24.52	-24.50		74.14	-74.13		15.93	
12 ^h 45 ^m	55 ^s .22		14 ^h 13 ^m	9 ^s .28		18 ^h 5 ^m	0 ^s .43		19 ^h 24 ^m	31 ^s .66		22 ^h 15 ^m	
-84° 39'	43'' .10		-83° 16'	47'' .50		-87° 39'	52'' .55		-89° 13'	43'' .28		-86° 24'	

[Eph 15]

APPARENT PLACES OF CIRCUMPOLAR STARS

FOR THE UPPER TRANSIT AT WASHINGTON.

1 Octantis. Mag. 5.4			δ Octantis. Mag. 4.1			χ Octantis. Mag. 5.2			σ Octantis. Mag. 5.5			ν Octantis. Mag. 5.7		
Right Ascension.	Declination South.	Mean Solar Date.	Right Ascension.	Declination South.	Mean Solar Date.	Right Ascension.	Declination South.	Mean Solar Date.	Right Ascension.	Declination South.	Mean Solar Date.	Right Ascension.	Declination South.	Mean Solar Date.
h m	° '		h m	° '		h m	° '		h m	° '		h m	° '	
12 46	84 39	Mar.	14 13	83 16	Mar.	18 5	87 39	Mar.	19 24	89 13	Mar.	22 15	86 23	Mar.
s	"		s	"		s	"		s	"		s	"	
3.12	42.25	0.7	15.05	43.55	0.8	1.82	43.35	0.9	17.69	34.33	0.9	36.18	59.18	
3.23	42.59	1.7	15.21	43.80	1.8	2.40	43.27	1.9	19.16	34.14	1.9	36.28	58.84	
3.35	42.91	2.6	15.38	44.04	2.8	2.96	43.17	2.9	20.57	33.92	2.9	36.35	58.49	
3.49	43.22	3.6	15.54	44.27	3.8	3.53	43.04	3.9	21.96	33.70	3.9	36.41	58.12	
3.63	43.55	4.6	15.72	44.50	4.8	4.13	42.90	4.9	23.43	33.44	4.9	36.46	57.74	
3.78	43.91	5.6	15.91	44.75	5.8	4.77	42.76	5.9	25.00	33.16	5.9	36.52	57.33	
3.94	44.28	6.6	16.10	45.03	6.8	5.44	42.63	6.9	26.69	32.90	6.9	36.60	56.90	
4.09	44.68	7.6	16.30	45.33	7.8	6.15	42.51	7.9	28.51	32.65	7.9	36.71	56.47	
4.22	45.09	8.6	16.48	45.65	8.8	6.87	42.43	8.8	30.41	32.42	8.9	36.85	56.04	
4.32	45.51	9.6	16.65	45.99	9.8	7.60	42.37	9.8	32.37	32.22	9.9	37.02	55.63	
4.42	45.93	10.6	16.81	46.34	10.8	8.31	42.34	10.8	34.30	32.05	10.9	37.21	55.24	
4.49	46.34	11.6	16.94	46.68	11.8	8.99	42.33	11.8	36.18	31.89	11.9	37.41	54.88	
4.55	46.73	12.6	17.06	47.01	12.8	9.63	42.32	12.8	37.97	31.76	12.9	37.60	54.54	
4.61	47.09	13.6	17.19	47.32	13.8	10.23	42.31	13.8	39.66	31.62	13.9	37.77	54.21	
4.68	47.44	14.6	17.31	47.62	14.8	10.82	42.29	14.8	41.27	31.47	14.9	37.93	53.89	
4.76	47.78	15.6	17.45	47.89	15.8	11.40	42.26	15.8	42.84	31.31	15.9	38.07	53.56	
4.84	48.12	16.6	17.58	48.16	16.8	11.98	42.20	16.8	44.40	31.15	16.9	38.19	53.21	
4.94	48.46	17.6	17.73	48.44	17.8	12.58	42.13	17.8	45.97	30.95	17.9	38.31	52.86	
5.04	48.82	18.6	17.88	48.72	18.8	13.21	42.07	18.8	47.62	30.76	18.9	38.44	52.49	
5.14	49.18	19.6	18.04	49.01	19.8	13.86	42.00	19.8	49.35	30.58	19.9	38.58	52.12	
5.23	49.57	20.6	18.20	49.32	20.8	14.53	41.95	20.8	51.18	30.39	20.9	38.74	51.73	
5.32	49.98	21.6	18.35	49.66	21.8	15.22	41.92	21.8	53.08	30.20	21.9	38.93	51.33	
5.40	50.39	22.6	18.49	50.00	22.8	15.93	41.90	22.8	55.04	30.05	22.9	39.12	50.94	
5.46	50.81	23.6	18.63	50.36	23.8	16.63	41.91	23.8	57.05	29.91	23.9	39.34	50.57	
5.51	51.23	24.6	18.75	50.73	24.8	17.33	41.94	24.8	59.06	29.79	24.9	39.58	50.21	
5.54	51.65	25.6	18.87	51.11	25.7	18.01	41.99	25.8	61.07	29.69	25.9	39.84	49.86	
5.55	52.06	26.6	18.97	51.48	26.7	18.67	42.05	26.8	63.01	29.61	26.9	40.10	49.54	
5.57	52.44	27.6	19.06	51.84	27.7	19.30	42.11	27.8	64.88	29.54	27.9	40.35	49.24	
5.58	52.81	28.6	19.15	52.17	28.7	19.90	42.16	28.8	66.65	29.47	28.9	40.58	48.94	
5.60	53.15	29.6	19.24	52.49	29.7	20.48	42.19	29.8	68.34	29.38	29.9	40.79	48.64	
5.64	53.50	30.6	19.34	52.79	30.7	21.07	42.21	30.8	70.02	29.28	30.9	40.98	48.33	
5.69	53.86	31.6	19.46	53.10	31.7	21.66	42.21	31.8	71.70	29.15	31.9	41.16	48.01	
5.75	54.22	32.6	19.57	53.40	32.7	22.25	42.21	32.8	73.38	29.02	32.9	41.34	47.69	
5.80	54.58	33.6	19.68	53.70	33.7	22.84	42.21	33.8	75.06	28.90	33.9	41.52	47.37	
5.85	54.94	34.6	19.79	54.00	34.7	23.43	42.21	34.8	76.74	28.78	34.9	41.70	47.05	
5.90	55.30	35.6	19.90	54.30	35.7	24.02	42.21	35.8	78.42	28.66	35.9	41.88	46.73	
5.95	55.66	36.6	20.01	54.60	36.7	24.61	42.21	36.8	80.10	28.54	36.9	42.06	46.41	
6.00	56.02	37.6	20.12	54.90	37.7	25.20	42.21	37.8	81.78	28.42	37.9	42.24	46.09	
6.05	56.38	38.6	20.23	55.20	38.7	25.79	42.21	38.8	83.46	28.30	38.9	42.42	45.77	
6.10	56.74	39.6	20.34	55.50	39.7	26.38	42.21	39.8	85.14	28.18	39.9	42.60	45.45	
6.15	57.10	40.6	20.45	55.80	40.7	26.97	42.21	40.8	86.82	28.06	40.9	42.78	45.13	
6.20	57.46	41.6	20.56	56.10	41.7	27.56	42.21	41.8	88.50	27.94	41.9	42.96	44.81	
6.25	57.82	42.6	20.67	56.40	42.7	28.15	42.21	42.8	90.18	27.82	42.9	43.14	44.49	
6.30	58.18	43.6	20.78	56.70	43.7	28.74	42.21	43.8	91.86	27.70	43.9	43.32	44.17	
6.35	58.54	44.6	20.89	57.00	44.7	29.33	42.21	44.8	93.54	27.58	44.9	43.50	43.85	
6.40	58.90	45.6	21.00	57.30	45.7	29.92	42.21	45.8	95.22	27.46	45.9	43.68	43.53	
6.45	59.26	46.6	21.11	57.60	46.7	30.51	42.21	46.8	96.90	27.34	46.9	43.86	43.21	
6.50	59.62	47.6	21.22	57.90	47.7	31.10	42.21	47.8	98.58	27.22	47.9	44.04	42.89	
6.55	59.98	48.6	21.33	58.20	48.7	31.69	42.21	48.8	100.26	27.10	48.9	44.22	42.57	
7.00	60.34	49.6	21.44	58.50	49.7	32.28	42.21	49.8	101.94	26.98	49.9	44.40	42.25	
7.05	60.70	50.6	21.55	58.80	50.7	32.87	42.21	50.8	103.62	26.86	50.9	44.58	41.93	
7.10	61.06	51.6	21.66	59.10	51.7	33.46	42.21	51.8	105.30	26.74	51.9	44.76	41.61	
7.15	61.42	52.6	21.77	59.40	52.7	34.05	42.21	52.8	106.98	26.62	52.9	44.94	41.29	
7.20	61.78	53.6	21.88	59.70	53.7	34.64	42.21	53.8	108.66	26.50	53.9	45.12	40.97	
7.25	62.14	54.6	21.99	60.00	54.7	35.23	42.21	54.8	110.34	26.38	54.9	45.30	40.65	
7.30	62.50	55.6	22.10	60.30	55.7	35.82	42.21	55.8	112.02	26.26	55.9	45.48	40.33	
7.35	62.86	56.6	22.21	60.60	56.7	36.41	42.21	56.8	113.70	26.14	56.9	45.66	40.01	
7.40	63.22	57.6	22.32	60.90	57.7	37.00	42.21	57.8	115.38	26.02	57.9	45.84	39.69	
7.45	63.58	58.6	22.43	61.20	58.7	37.59	42.21	58.8	117.06	25.90	58.9	46.02	39.37	
7.50	63.94	59.6	22.54	61.50	59.7	38.18	42.21	59.8	118.74	25.78	59.9	46.20	39.05	
7.55	64.30	60.6	22.65	61.80	60.7	38.77	42.21	60.8	120.42	25.66	60.9	46.38	38.73	
8.00	64.66	61.6	22.76	62.10	61.7	39.36	42.21	61.8	122.10	25.54	61.9	46.56	38.41	
8.05	65.02	62.6	22.87	62.40	62.7	39.95	42.21	62.8	123.78	25.42	62.9	46.74	38.09	
8.10	65.38	63.6	22.98	62.70	63.7	40.54	42.21	63.8	125.46	25.30	63.9	46.92	37.77	
8.15	65.74	64.6	23.09	63.00	64.7	41.13	42.21	64.8	127.14	25.18	64.9	47.10	37.45	
8.20	66.10	65.6	23.20	63.30	65.7	41.72	42.21	65.8	128.82	25.06	65.9	47.28	37.13	
8.25	66.46	66.6	23.31	63.60	66.7	42.31	42.21	66.8	130.50	24.94	66.9	47.46	36.81	
8.30	66.82	67.6	23.42	63.90	67.7	42.90	42.21	67.8	132.18	24.82	67.9	47.64	36.49	
8.35	67.18	68.6	23.53	64.20	68.7	43.49	42.21	68.8	133.86	24.70	68.9	47.82	36.17	
8.40	67.54	69.6	23.64	64.50	69.7	44.08	42.21	69.8	135.54	24.58	69.9	48.00	35.85	
8.45	67.90	70.6	23.75	64.80	70.7	44.67	42.21	70.8	137.22	24.46	70.9	48.18	35.53	
8.50	68.26	71.6	23.86	65.10	71.7	45.26	42.21	71.8	138.90	24.34	71.9	48.36	35.21	
8.55	68.62	72.6	23.97	65.40	72.7	45.85	42.21	72.8	140.58	24.22	72.9	48.54	34.89	
9.00	68.98	73.6	24.08	65.70	73.7	46.44	42.21	73.8	142.26	24.10	73.9	48.72	34.57	
9.05	69.34	74.6	24.19	66.00	74.7	47.03	42.21	74.8	143.94	23.98	74.9	48.90	34.25	
9.10	69.70	75.6	24.30	66.30	75.7	47.62	42.21	75.8	145.62	23.86	75.9	49.08	33.93	
9.15	70.06	76.6	24.41	66.60	76.7	48.21	42.21	76.8	147.30	23.74	76.9	49.26	33.61	
9.20	70.42	77.6	24.52	66.90	77.7	48.80	42.21	77.8	148.98	23.62	77.9	49.44	33.29	
9.25	70.78	78.6	24.63	67.20	78.7	49.39	42.21	78.8	150.66	23.50	78.9	49.62	32.97	
9.30	71.14	79.6	24.74	67.50	79.7	49.98	42.21	79						

**APPARENT PLACES OF CIRCUMPOLAR STARS
FOR THE UPPER TRANSIT AT WASHINGTON.**

♏ Octantis. Mag. 5.4			♐ Octantis. Mag. 4.1			♑ Octantis. Mag. 5.2			♒ Octantis. Mag. 5.5			♓ Octantis. Mag. 5.7		
Mean Solar Date.	Right Ascension.	Declination South.	Mean Solar Date.	Right Ascension.	Declination South.	Mean Solar Date.	Right Ascension.	Declination South.	Mean Solar Date.	Right Ascension.	Declination South.	Mean Solar Date.	Right Ascension.	Declination South.
Apr. 12 46	h m	° '	Apr. 14 13	h m	° '	Apr. 18 5	h m	° '	Apr. 19 25	h m	° '	Apr. 22 15	h m	° '
	s	"		s	"		s	"		s	"		s	"
0.5	5.69	53.86	0.6	19.46	53.10	0.7	21.66	42.21	0.8	11.70	29.15	0.9	41.16	48.88
1.5	5.75	54.22	1.6	19.58	53.41	1.7	22.29	42.20	1.8	13.46	29.01	1.9	41.35	47.66
2.5	5.81	54.61	2.6	19.70	53.74	2.7	22.95	42.19	2.8	15.33	28.87	2.9	41.55	47.39
3.5	5.86	55.02	3.6	19.83	54.09	3.7	23.65	42.20	3.8	17.32	28.75	3.9	41.78	46.98
4.5	5.90	55.44	4.6	19.96	54.47	4.7	24.37	42.23	4.8	19.41	28.63	4.9	42.03	46.55
5.5	5.92	55.88	5.6	20.07	54.86	5.7	25.10	42.29	5.8	21.55	28.54	5.9	42.31	46.19
6.5	5.92	56.31	6.6	20.16	55.26	6.7	25.80	42.38	6.8	23.68	28.49	6.9	42.62	45.85
7.5	5.91	56.73	7.6	20.24	55.66	7.7	26.46	42.50	7.8	25.75	28.45	7.9	42.94	45.58
8.5	5.88	57.12	8.5	20.30	56.05	8.7	27.10	42.62	8.8	27.72	28.43	8.9	43.25	45.28
9.5	5.84	57.50	9.5	20.36	56.42	9.7	27.69	42.74	9.8	29.60	28.42	9.9	43.54	44.98
10.5	5.81	57.85	10.5	20.41	56.76	10.7	28.26	42.85	10.8	31.38	28.41	10.9	43.82	44.77
11.5	5.78	58.19	11.5	20.47	57.09	11.7	28.80	42.95	11.8	33.07	28.39	11.9	44.08	44.58
12.5	5.77	58.53	12.5	20.53	57.41	12.7	29.35	43.03	12.8	34.75	28.35	12.9	44.33	44.38
13.5	5.77	58.87	13.5	20.60	57.72	13.7	29.91	43.09	13.8	36.43	28.31	13.9	44.57	44.18
14.5	5.78	59.21	14.5	20.68	58.04	14.7	30.48	43.16	14.7	38.17	28.25	14.9	44.80	43.98
15.5	5.79	59.56	15.5	20.77	58.37	15.7	31.08	43.23	15.7	39.96	28.18	15.9	45.05	43.78
16.5	5.79	59.93	16.5	20.86	58.71	16.7	31.69	43.30	16.7	41.81	28.12	16.9	45.31	43.58
17.5	5.79	60.31	17.5	20.94	59.07	17.7	32.32	43.38	17.7	43.73	28.07	17.9	45.59	43.38
18.5	5.77	60.70	18.5	21.02	59.44	18.7	32.97	43.48	18.7	45.73	28.03	18.9	45.89	43.18
19.5	5.75	61.10	19.5	21.08	59.82	19.7	33.61	43.61	19.7	47.76	28.02	19.9	46.21	42.98
20.5	5.70	61.50	20.5	21.14	60.21	20.7	34.24	43.76	20.7	49.80	28.03	20.9	46.54	42.78
21.5	5.64	61.90	21.5	21.18	60.61	21.7	34.86	43.92	21.7	51.83	28.07	21.8	46.89	42.58
22.4	5.57	62.28	22.5	21.21	61.00	22.7	35.46	44.10	22.7	53.80	28.11	22.8	47.24	42.38
23.4	5.49	62.65	23.5	21.24	61.38	23.7	36.02	44.28	23.7	55.68	28.17	23.8	47.58	42.18
24.4	5.41	62.99	24.5	21.25	61.74	24.7	36.55	44.46	24.7	57.48	28.23	24.8	47.92	41.98
25.4	5.34	63.31	25.5	21.27	62.09	25.7	37.06	44.63	25.7	59.18	28.29	25.8	48.24	41.78
26.4	5.27	63.62	26.5	21.30	62.41	26.7	37.56	44.77	26.7	60.83	28.32	26.8	48.53	41.58
27.4	5.22	63.93	27.5	21.33	62.72	27.7	38.06	44.90	27.7	62.46	28.33	27.8	48.80	41.38
28.4	5.19	64.26	28.5	21.37	63.04	28.7	38.59	45.02	28.7	64.14	28.33	28.8	49.07	41.18
29.4	5.16	64.60	29.5	21.43	63.38	29.7	39.15	45.13	29.7	65.91	28.31	29.8	49.36	40.98
30.4	5.12	64.95	30.5	21.48	63.73	30.6	39.74	45.25	30.7	67.77	28.31	30.8	49.66	40.78
31.4	5.08	65.33	31.5	21.53	64.10	31.6	40.35	45.39	31.7	69.74	28.32	31.8	49.99	40.58
10.76	-10.71	8.55	-8.49	24.51	-24.49	73.88	-73.88	15.91	-15.87					
12 ^h 45 ^m	55 ^s .22	14 ^h 13 ^m	9 ^s .28	18 ^h 5 ^m	0 ^s .43	19 ^h 24 ^m	31 ^s .66	22 ^h 15 ^m	43 ^s .98					
-84° 39'	43'' .10	-83° 16'	47'' .50	-87° 39'	52'' .55	-89° 13'	43'' .28	-86° 24'	3'' .31					

[Eph 15]

APPARENT PLACES OF CIRCUMPOLAR STARS
FOR THE UPPER TRANSIT AT WASHINGTON.

♌ Octantis. Mag. 5.4			♍ Octantis. Mag. 4.1			♎ Octantis. Mag. 5.2			♏ Octantis. Mag. 5.5			♐ Octantis. Mag. 5.7		
m	Right Ascension.	Declination South.	Mean Solar Date.	Right Ascension.	Declination South.	Mean Solar Date.	Right Ascension.	Declination South.	Mean Solar Date.	Right Ascension.	Declination South.	Mean Solar Date.	Right Ascension.	Declination South.
r	h m 12 46	° ' " 84 40	May	h m 14 13	° ' " 83 17	May	h m 18 5	° ' " 87 39	May	h m 19 26	° ' " 89 13	May	h m 22 15	° ' " 86 23
	s "	"		s "	"		s "	"		s "	"		s "	"
4	5.12	4.95	0.5	21.48	3.73	0.6	39.74	45.25	0.7	7.77	28.31	0.8	49.66	39.64
4	5.08	5.33	1.5	21.53	4.10	1.6	40.35	45.39	1.7	9.74	28.32	1.8	49.99	39.38
4	5.02	5.72	2.5	21.57	4.49	2.6	40.97	45.55	2.7	11.77	28.35	2.8	50.34	39.12
4	4.94	6.11	3.5	21.59	4.89	3.6	41.58	45.74	3.7	13.81	28.41	3.8	50.72	38.88
4	4.84	6.48	4.5	21.60	5.30	4.6	42.16	45.97	4.7	15.83	28.51	4.8	51.12	38.68
4	4.72	6.84	5.5	21.59	5.70	5.6	42.70	46.21	5.7	17.74	28.62	5.8	51.52	38.51
4	4.60	7.17	6.5	21.58	6.07	6.6	43.19	46.45	6.7	19.52	28.74	6.8	51.90	38.35
4	4.48	7.47	7.5	21.56	6.42	7.6	43.64	46.68	7.7	21.18	28.87	7.8	52.25	38.21
4	4.37	7.75	8.5	21.53	6.75	8.6	44.07	46.90	8.7	22.74	28.99	8.8	52.59	38.07
4	4.26	8.03	9.5	21.51	7.05	9.6	44.49	47.09	9.7	24.25	29.08	9.8	52.91	37.94
4	4.17	8.30	10.5	21.51	7.34	10.6	44.91	47.27	10.7	25.75	29.17	10.8	53.22	37.79
4	4.07	8.57	11.5	21.51	7.64	11.6	45.35	47.45	11.7	27.26	29.24	11.8	53.52	37.64
4	3.99	8.86	12.5	21.51	7.94	12.6	45.80	47.62	12.7	28.82	29.31	12.8	53.83	37.47
4	3.91	9.15	13.5	21.52	8.26	13.6	46.27	47.78	13.7	30.45	29.37	13.8	54.14	37.29
4	3.82	9.46	14.4	21.53	8.59	14.6	46.75	47.96	14.7	32.13	29.45	14.8	54.47	37.11
4	3.73	9.77	15.4	21.53	8.93	15.6	47.25	48.17	15.7	33.87	29.54	15.8	54.83	36.94
4	3.62	10.10	16.4	21.52	9.28	16.6	47.75	48.39	16.7	35.64	29.65	16.8	55.20	36.77
4	3.50	10.42	17.4	21.50	9.64	17.6	48.24	48.63	17.7	37.42	29.78	17.8	55.58	36.62
4	3.36	10.73	18.4	21.48	10.01	18.6	48.72	48.89	18.7	39.20	29.93	18.8	55.98	36.49
4	3.22	11.04	19.4	21.44	10.37	19.6	49.17	49.16	19.7	40.92	30.09	19.8	56.39	36.37
4	3.06	11.32	20.4	21.38	10.72	20.6	49.58	49.45	20.7	42.56	30.27	20.8	56.79	36.28
4	2.90	11.58	21.4	21.33	11.05	21.6	49.96	49.73	21.6	44.09	30.46	21.8	57.18	36.21
4	2.74	11.83	22.4	21.27	11.36	22.6	50.32	50.00	22.6	45.52	30.65	22.8	57.54	36.14
4	2.59	12.06	23.4	21.21	11.65	23.6	50.65	50.25	23.6	46.87	30.81	23.8	57.89	36.08
4	2.45	12.28	24.4	21.16	11.93	24.6	50.97	50.48	24.6	48.19	30.97	24.8	58.21	36.01
4	2.33	12.51	25.4	21.13	12.20	25.6	51.31	50.69	25.6	49.51	31.09	25.8	58.52	35.92
4	2.22	12.75	26.4	21.10	12.48	26.6	51.68	50.89	26.6	50.91	31.21	26.8	58.83	35.80
4	2.11	13.00	27.4	21.08	12.77	27.6	52.08	51.10	27.6	52.38	31.32	27.7	59.16	35.68
4	2.00	13.27	28.4	21.06	13.08	28.6	52.50	51.32	28.6	53.95	31.45	28.7	59.51	35.55
3	1.87	13.55	29.4	21.04	13.41	29.6	52.94	51.57	29.6	55.60	31.59	29.7	59.89	35.43
3	1.73	13.84	30.4	20.99	13.76	30.6	53.38	51.84	30.6	57.28	31.76	30.7	60.29	35.32
3	1.56	14.13	31.4	20.93	14.11	31.6	53.79	52.14	31.6	58.94	31.96	31.7	60.71	35.24
476	-10.72	8.55	-8.49	24.53	-24.51	73.92	-73.91	15.90	-15.87					
45 ^m	55°.22	14 ^h 13 ^m	9°.28	18 ^h 5 ^m	0°.43	19 ^h 24 ^m	31°.66	22 ^h 15 ^m	43°.98					
39'	43''.10	-83° 16'	47''.50	-87° 39'	52''.55	-89° 13'	43''.28	-86° 24'	3''.31					

[Eph 13]

APPARENT PLACES OF CIRCUMPOLAR STARS
FOR THE UPPER TRANSIT AT WASHINGTON.

♌ Octantis. Mag. 5.4			♋ Octantis. Mag. 4.1			♊ Octantis. Mag. 5.2			♏ Octantis. Mag. 5.5			♍ Octantis. Mag. 5.7		
Mean Solar Date.	Right Ascension.	Declination South.	Mean Solar Date.	Right Ascension.	Declination South.	Mean Solar Date.	Right Ascension.	Declination South.	Mean Solar Date.	Right Ascension.	Declination South.	Mean Solar Date.	Right Ascension.	Declination South.
June	h m 12 45	° ' " 84 40	June	h m 14 13	° ' " 83 17	June	h m 18 5	° ' " 87 39	June	h m 19 26	° ' " 89 13	June	h m 22 16	° ' " 86 23
0.3	61.56	14.13	0.4	20.93	14.11	0.6	53.79	52.14	0.6	58.94	31.96	0.7	0.71	35.44
1.3	61.37	14.40	1.4	20.86	14.45	1.6	54.16	52.46	1.6	60.50	32.18	1.7	1.13	35.19
2.3	61.17	14.63	2.4	20.77	14.77	2.6	54.47	52.78	2.6	61.92	32.43	2.7	1.53	35.17
3.3	60.98	14.84	3.4	20.67	15.07	3.6	54.75	53.09	3.6	63.22	32.66	3.7	1.98	35.17
4.3	60.80	15.03	4.4	20.58	15.34	4.6	55.00	53.39	4.6	64.42	32.90	4.7	2.28	35.15
5.3	60.62	15.19	5.4	20.49	15.58	5.6	55.23	53.67	5.6	65.52	33.11	5.7	2.62	35.17
6.3	60.45	15.35	6.4	20.40	15.82	6.5	55.44	53.93	6.6	66.57	33.33	6.7	2.94	35.17
7.3	60.29	15.52	7.4	20.32	16.05	7.5	55.67	54.18	7.6	67.62	33.51	7.7	3.25	35.15
8.3	60.15	15.68	8.4	20.25	16.28	8.5	55.91	54.42	8.6	68.70	33.69	8.7	3.57	35.15
9.3	60.01	15.85	9.4	20.19	16.52	9.5	56.17	54.66	9.6	69.83	33.88	9.7	3.89	35.13
10.3	59.86	16.03	10.4	20.13	16.76	10.5	56.44	54.90	10.6	71.00	34.06	10.7	4.22	35.15
11.3	59.71	16.23	11.4	20.06	17.02	11.5	56.72	55.16	11.6	72.23	34.25	11.7	4.57	35.17
12.3	59.54	16.43	12.4	19.99	17.29	12.5	57.00	55.45	12.6	73.51	34.46	12.7	4.93	35.17
13.3	59.36	16.63	13.4	19.90	17.57	13.5	57.27	55.75	13.6	74.79	34.69	13.7	5.30	35.17
14.3	59.17	16.82	14.4	19.80	17.85	14.5	57.54	56.06	14.6	76.07	34.93	14.7	5.69	35.17
15.3	58.97	17.01	15.4	19.70	18.13	15.5	57.78	56.39	15.6	77.29	35.20	15.7	6.08	35.17
16.3	58.75	17.17	16.4	19.58	18.40	16.5	57.98	56.72	16.6	78.43	35.48	16.7	6.48	35.11
17.3	58.53	17.32	17.4	19.46	18.65	17.5	58.15	57.06	17.6	79.46	35.76	17.7	6.86	35.17
18.3	58.31	17.44	18.4	19.33	18.88	18.5	58.28	57.39	18.6	80.38	36.05	18.7	7.22	35.25
19.3	58.10	17.54	19.4	19.20	19.09	19.5	58.38	57.70	19.6	81.18	36.33	19.7	7.55	35.34
20.3	57.91	17.63	20.3	19.08	19.27	20.5	58.47	57.98	20.6	81.93	36.58	20.7	7.86	35.42
21.3	57.73	17.72	21.3	18.97	19.44	21.5	58.57	58.25	21.6	82.67	36.81	21.7	8.15	35.47
22.3	57.57	17.82	22.3	18.88	19.61	22.5	58.69	58.50	22.6	83.44	37.02	22.7	8.43	35.53
23.3	57.41	17.92	23.3	18.79	19.79	23.5	58.84	58.75	23.6	84.28	37.22	23.7	8.72	35.57
24.3	57.25	18.05	24.3	18.71	20.00	24.5	59.02	59.00	24.6	85.23	37.43	24.7	9.03	35.59
25.3	57.08	18.19	25.3	18.61	20.22	25.5	59.22	59.28	25.6	86.26	37.65	25.7	9.36	35.61
26.3	56.90	18.34	26.3	18.51	20.44	26.5	59.41	59.58	26.6	87.34	37.91	26.7	9.72	35.64
27.3	56.69	18.49	27.3	18.40	20.71	27.5	59.59	59.91	27.5	88.41	38.18	27.7	10.10	35.61
28.3	56.47	18.63	28.3	18.27	20.95	28.5	59.74	60.26	28.5	89.38	38.48	28.7	10.48	35.71
29.3	56.23	18.74	29.3	18.13	21.17	29.5	59.84	60.61	29.5	90.22	38.79	29.7	10.85	35.81
30.3	56.00	18.82	30.3	17.98	21.37	30.5	59.89	60.96	30.5	90.94	39.11	30.7	11.21	36.01
31.3	55.77	18.87	31.3	17.82	21.54	31.5	59.90	61.30	31.5	91.52	39.43	31.7	11.53	36.11
10.77	-10.72		8.56	-8.50		24.55	-24.53		74.07	-74.06		15.90	-15.86	
12 ^h 45 ^m	55°.22		14 ^h 13 ^m	9°.28		18 ^h 5 ^m	0°.43		19 ^h 24 ^m	31°.66		22 ^h 15 ^m	43°.06	
-84° 39'	43''.10		-83° 16'	47''.50		-87° 39'	52''.55		-89° 13'	43''.28		-86° 24'	3''.31	

APPARENT PLACES OF CIRCUMPOLAR STARS
FOR THE UPPER TRANSIT AT WASHINGTON.

ε Octantis. Mag. 5.4			δ Octantis. Mag. 4.1			χ Octantis. Mag. 5.2			σ Octantis. Mag. 5.5			υ Octantis. Mag. 5.7		
Mean Solar Date.	Right Ascension.	Declination South.	Mean Solar Date.	Right Ascension.	Declination South.	Mean Solar Date.	Right Ascension.	Declination South.	Mean Solar Date.	Right Ascension.	Declination South.	Mean Solar Date.	Right Ascension.	Declination South.
July 12 45	18 40	84 40	July 14 13	17 83	17 17	July 18 5	17 87	17 40	July 19 27	17 89	17 13	July 22 16	17 86	17 23
3 56.00	18.82	0.3	3 17.98	21.37	0.5	3 59.89	0.96	0.5	3 30.94	39.11	0.7	3 11.21	36.03	
3 55.77	18.87	1.3	3 17.82	21.54	1.5	3 59.90	1.30	1.5	3 31.52	39.43	1.7	3 11.53	36.18	
3 55.55	18.90	2.3	3 17.67	21.68	2.5	3 59.88	1.61	2.5	3 32.00	39.75	2.7	3 11.83	36.33	
3 55.35	18.92	3.3	3 17.53	21.81	3.5	3 59.86	1.90	3.5	3 32.43	40.02	3.6	3 12.11	36.48	
2 55.15	18.94	4.3	2 17.40	21.92	4.5	2 59.83	2.17	4.5	2 32.81	40.30	4.6	2 12.37	36.62	
2 54.97	18.95	5.3	2 17.28	22.03	5.5	2 59.81	2.43	5.5	2 33.22	40.54	5.6	2 12.62	36.75	
2 54.80	18.97	6.3	2 17.16	22.14	6.5	2 59.81	2.69	6.5	2 33.65	40.79	6.6	2 12.88	36.86	
2 54.62	19.01	7.3	2 17.04	22.27	7.5	2 59.82	2.95	7.5	2 34.14	41.04	7.6	2 13.14	36.97	
2 54.43	19.05	8.3	2 16.92	22.40	8.5	2 59.84	3.22	8.5	2 34.66	41.29	8.6	2 13.42	37.08	
2 54.24	19.10	9.3	2 16.79	22.54	9.5	2 59.88	3.51	9.5	2 35.22	41.56	9.6	2 13.71	37.20	
2 54.04	19.15	10.3	2 16.65	22.70	10.5	2 59.90	3.81	10.5	2 35.81	41.84	10.6	2 14.02	37.32	
2 53.82	19.20	11.3	2 16.51	22.85	11.5	2 59.91	4.12	11.5	2 36.38	42.14	11.6	2 14.33	37.46	
2 53.60	19.24	12.3	2 16.36	23.01	12.4	2 59.91	4.45	12.5	2 36.93	42.45	12.6	2 14.65	37.62	
2 53.38	19.26	13.3	2 16.20	23.15	13.4	2 59.88	4.79	13.5	2 37.39	42.78	13.6	2 14.96	37.79	
2 53.14	19.26	14.3	2 16.03	23.28	14.4	2 59.80	5.12	14.5	2 37.74	43.12	14.6	2 15.27	37.99	
2 52.89	19.24	15.3	2 15.86	23.38	15.4	2 59.69	5.45	15.5	2 37.98	43.45	15.6	2 15.55	38.20	
2 52.66	19.20	16.3	2 15.68	23.46	16.4	2 59.55	5.76	16.5	2 38.10	43.78	16.6	2 15.81	38.43	
2 52.45	19.14	17.3	2 15.52	23.52	17.4	2 59.39	6.05	17.5	2 38.13	44.08	17.6	2 16.05	38.65	
2 52.26	19.07	18.3	2 15.36	23.56	18.4	2 59.23	6.32	18.5	2 38.10	44.38	18.6	2 16.26	38.86	
2 52.08	19.00	19.3	2 15.22	23.59	19.4	2 59.08	6.57	19.5	2 38.09	44.64	19.6	2 16.45	39.05	
2 51.91	18.94	20.3	2 15.09	23.63	20.4	2 58.95	6.80	20.5	2 38.15	44.90	20.6	2 16.65	39.22	
2 51.74	18.91	21.3	2 14.96	23.68	21.4	2 58.86	7.03	21.5	2 38.29	45.14	21.6	2 16.86	39.37	
2 51.57	18.89	22.3	2 14.84	23.75	22.4	2 58.80	7.27	22.5	2 38.52	45.40	22.6	2 17.08	39.51	
2 51.40	18.89	23.3	2 14.71	23.85	23.4	2 58.74	7.54	23.5	2 38.82	45.66	23.6	2 17.33	39.67	
2 51.20	18.88	24.3	2 14.57	23.95	24.4	2 58.67	7.83	24.5	2 39.13	45.95	24.6	2 17.60	39.84	
2 50.98	18.86	25.3	2 14.41	24.05	25.4	2 58.58	8.14	25.5	2 39.39	46.28	25.6	2 17.88	40.04	
2 50.75	18.83	26.2	2 14.23	24.14	26.4	2 58.44	8.46	26.5	2 39.53	46.61	26.6	2 18.15	40.27	
2 50.52	18.76	27.2	2 14.06	24.20	27.4	2 58.26	8.78	27.5	2 39.54	46.96	27.6	2 18.40	40.52	
2 50.29	18.67	28.2	2 13.87	24.24	28.4	2 58.03	9.09	28.5	2 39.42	47.29	28.6	2 18.63	40.79	
2 50.07	18.56	29.2	2 13.69	24.24	29.4	2 57.77	9.38	29.5	2 39.16	47.62	29.6	2 18.83	41.06	
2 49.86	18.43	30.2	2 13.52	24.22	30.4	2 57.49	9.64	30.5	2 38.83	47.93	30.6	2 18.99	41.33	
2 49.67	18.29	31.2	2 13.35	24.19	31.4	2 57.21	9.88	31.5	2 38.43	48.22	31.6	2 19.14	41.59	
1.77	-10.72	8.56	-8.50	24.58	-24.56	74.29	-74.28	15.90	-15.87					
45 ^m	55 ^s .22	14 ^h 13 ^m	9 ^s .28	18 ^h 5 ^m	0 ^s .43	19 ^h 24 ^m	31 ^s .66	22 ^h 15 ^m	43 ^s .98					
39'	43'''.10	-83° 16'	47'''.50	-87° 39'	52'''.55	-89° 13'	43'''.28	-86° 24'	3'''.31					

[Rph 15]

APPARENT PLACES OF CIRCUMPOLAR STARS
FOR THE UPPER TRANSIT AT WASHINGTON.

♌ Octantis. Mag. 5.4			♍ Octantis. Mag. 4.1			♎ Octantis. Mag. 5.2			♏ Octantis. Mag. 5.5			♐ Octantis. Mag. 5.7		
Mean Solar Date.	Right Ascension.	Declination South.	Mean Solar Date.	Right Ascension.	Declination South.	Mean Solar Date.	Right Ascension.	Declination South.	Mean Solar Date.	Right Ascension.	Declination South.	Mean Solar Date.	Right Ascension.	Declination South.
Aug.	h m 12 45	° ' 84 40	Aug.	h m 14 13	° ' 83 17	Aug.	h m 18 5	° ' 87 40	Aug.	h m 19 27	° ' 89 13	Aug.	h m 22 16	° ' 86 13
	s 49.67	" 18.29		s 13.35	" 24.19		s 57.21	" 9.88		s 38.43	" 48.22		s 19.14	" 41.59
0.2	49.67	18.29	0.2	13.35	24.19	0.4	57.21	9.88	0.5	38.43	48.22	0.6	19.14	41.59
1.2	49.50	18.15	1.2	13.20	24.16	1.4	56.94	10.10	1.5	38.05	48.48	1.6	19.28	41.84
2.2	49.33	18.02	2.2	13.05	24.12	2.4	56.68	10.32	2.4	37.68	48.74	2.6	19.42	42.07
3.2	49.17	17.90	3.2	12.91	24.09	3.4	56.44	10.53	3.4	37.37	48.99	3.6	19.55	42.29
4.2	49.01	17.78	4.2	12.77	24.07	4.4	56.22	10.74	4.4	37.09	49.24	4.6	19.70	42.51
5.2	48.84	17.68	5.2	12.63	24.05	5.4	56.01	10.97	5.4	36.85	49.50	5.6	19.85	42.73
6.2	48.66	17.58	6.2	12.48	24.05	6.4	55.79	11.21	6.4	36.64	49.78	6.6	20.02	42.95
7.2	48.48	17.48	7.2	12.33	24.05	7.4	55.57	11.46	7.4	36.44	50.07	7.6	20.20	43.19
8.2	48.29	17.37	8.2	12.17	24.06	8.4	55.33	11.72	8.4	36.20	50.37	8.5	20.39	43.44
9.2	48.08	17.26	9.2	12.00	24.06	9.4	55.07	11.99	9.4	35.91	50.68	9.5	20.58	43.71
10.1	47.87	17.12	10.2	11.82	24.03	10.4	54.77	12.26	10.4	35.52	50.99	10.5	20.76	44.01
11.1	47.66	16.95	11.2	11.63	23.99	11.4	54.44	12.52	11.4	35.03	51.32	11.5	20.92	44.31
12.1	47.46	16.77	12.2	11.45	23.93	12.4	54.08	12.77	12.4	34.41	51.64	12.5	21.05	44.62
13.1	47.28	16.57	13.2	11.27	23.84	13.4	53.69	13.00	13.4	33.68	51.94	13.5	21.15	44.93
14.1	47.11	16.36	14.2	11.10	23.73	14.4	53.29	13.20	14.4	32.89	52.21	14.5	21.22	45.24
15.1	46.96	16.14	15.2	10.95	23.61	15.4	52.91	13.38	15.4	32.11	52.45	15.5	21.28	45.53
16.1	46.82	15.93	16.2	10.81	23.49	16.4	52.55	13.53	16.4	31.35	52.68	16.5	21.33	45.79
17.1	46.69	15.75	17.2	10.69	23.39	17.4	52.22	13.68	17.4	30.67	52.89	17.5	21.38	46.03
18.1	46.57	15.58	18.2	10.56	23.30	18.3	51.92	13.84	18.4	30.08	53.11	18.5	21.44	46.26
19.1	46.43	15.43	19.2	10.43	23.23	19.3	51.63	14.01	19.4	29.56	53.33	19.5	21.53	46.49
20.1	46.29	15.28	20.2	10.30	23.17	20.3	51.35	14.20	20.4	29.09	53.58	20.5	21.64	46.73
21.1	46.13	15.13	21.2	10.14	23.12	21.3	51.05	14.42	21.4	28.61	53.83	21.5	21.76	46.99
22.1	45.96	14.96	22.2	9.98	23.06	22.3	50.72	14.64	22.4	28.04	54.13	22.5	21.88	47.28
23.1	45.77	14.77	23.2	9.81	22.98	23.3	50.34	14.87	23.4	27.33	54.41	23.5	21.99	47.59
24.1	45.59	14.56	24.2	9.64	22.87	24.3	49.93	15.08	24.4	26.49	54.72	24.5	22.07	47.92
25.1	45.42	14.31	25.2	9.46	22.73	25.3	49.47	15.27	25.4	25.52	55.00	25.5	22.12	48.25
26.1	45.27	14.05	26.2	9.30	22.57	26.3	48.99	15.43	26.4	24.45	55.25	26.5	22.13	48.58
27.1	45.13	13.78	27.2	9.14	22.40	27.3	48.51	15.58	27.4	23.33	55.50	27.5	22.13	48.91
28.1	45.01	13.51	28.2	9.00	22.21	28.3	48.05	15.70	28.4	22.21	55.70	28.5	22.12	49.22
29.1	44.90	13.25	29.2	8.87	22.02	29.3	47.60	15.81	29.4	21.11	55.91	29.5	22.09	49.51
30.1	44.80	13.00	30.2	8.75	21.84	30.3	47.16	15.91	30.4	20.04	56.10	30.5	22.06	49.78
31.1	44.71	12.76	31.2	8.63	21.67	31.3	46.75	16.00	31.4	19.03	56.28	31.5	22.04	50.05
10.76	-10.72		8.56	-8.50		24.60	-24.58		74.53	-74.53		15.91	-15.88	
12 ^h 45 ^m	55 ^s .22		14 ^h 13 ^m	9 ^s .28		18 ^h 5 ^m	0 ^s .43		19 ^h 24 ^m	31 ^s .66		22 ^h 15 ^m	43 ^s .98	
-84° 39'	43'' .10		-83° 16'	47'' .50		-87° 39'	52'' .55		-89° 13'	43'' .28		-86° 24'	3'' .31	

APPARENT PLACES OF CIRCUMPOLAR STARS

FOR THE UPPER TRANSIT AT WASHINGTON.

I Octantis. Mag. 5.4			δ Octantis. Mag. 4.1			χ Octantis. Mag. 5.2			σ Octantis. Mag. 5.5			υ Octantis. Mag. 5.7		
an lar te.	Right Ascension.	Declination South.	Mean Solar Date.	Right Ascension.	Declination South.	Mean Solar Date.	Right Ascension.	Declination South.	Mean Solar Date.	Right Ascension.	Declination South.	Mean Solar Date.	Right Ascension.	Declination South.
pt.	h m	° '	Sept.	h m	° '	Sept.	h m	° '	Sept.	h m	° '	Sept.	h m	° '
	12 45	84 40		14 13	83 17		18 5	87 40		19 26	89 13		22 16	86 23
	s	"		s	"		s	"		s	"		s	"
-I	44.71	12.76	0.2	8.63	21.67	0.3	46.75	16.00	0.4	79.03	56.28	0.5	22.04	50.05
-I	44.62	12.53	1.1	8.51	21.51	1.3	46.36	16.11	1.4	78.07	56.46	1.5	22.03	50.32
-I	44.51	12.30	2.1	8.38	21.36	2.3	45.97	16.23	2.4	77.14	56.66	2.5	22.03	50.59
-I	44.39	12.08	3.1	8.25	21.22	3.3	45.57	16.35	3.4	76.24	56.86	3.5	22.04	50.87
-I	44.27	11.85	4.1	8.12	21.07	4.3	45.16	16.49	4.4	75.31	57.08	4.5	22.06	51.15
-I	44.14	11.62	5.1	7.98	20.92	5.3	44.74	16.64	5.4	74.34	57.31	5.5	22.07	51.45
-I	44.01	11.37	6.1	7.83	20.76	6.3	44.29	16.78	6.4	73.29	57.54	6.5	22.08	51.77
-I	43.88	11.11	7.1	7.68	20.59	7.3	43.81	16.92	7.4	72.18	57.77	7.5	22.08	52.09
-I	43.76	10.83	8.1	7.53	20.39	8.3	43.30	17.05	8.3	70.95	58.00	8.5	22.05	52.43
-I	43.65	10.53	9.1	7.39	20.17	9.3	42.77	17.16	9.3	69.61	58.22	9.5	21.99	52.77
-I	43.56	10.22	10.1	7.25	19.93	10.3	42.24	17.24	10.3	68.20	58.40	10.5	21.90	53.10
-I	43.48	9.90	11.1	7.13	19.68	11.3	41.71	17.29	11.3	66.76	58.57	11.5	21.80	53.40
-I	43.42	9.59	12.1	7.02	19.42	12.3	41.20	17.31	12.3	65.34	58.70	12.5	21.68	53.69
-I	43.38	9.30	13.1	6.93	19.18	13.3	40.72	17.32	13.3	63.99	58.80	13.5	21.55	53.95
-I	43.35	9.03	14.1	6.85	18.95	14.3	40.28	17.33	14.3	62.76	58.90	14.4	21.43	54.19
-O	43.31	8.77	15.1	6.77	18.73	15.3	39.87	17.35	15.3	61.61	59.03	15.4	21.33	54.43
1.0	43.25	8.53	16.1	6.68	18.53	16.3	39.46	17.39	16.3	60.52	59.15	16.4	21.26	54.67
1.0	43.19	8.29	17.1	6.58	18.35	17.3	39.06	17.45	17.3	59.46	59.29	17.4	21.21	54.92
1.0	43.11	8.05	18.1	6.47	18.17	18.3	38.63	17.53	18.3	58.34	59.46	18.4	21.16	55.19
1.0	43.03	7.78	19.1	6.35	17.97	19.3	38.16	17.62	19.3	57.12	59.64	19.4	21.09	55.49
2.0	42.94	7.49	20.1	6.23	17.75	20.3	37.65	17.69	20.3	55.76	59.81	20.4	21.01	55.80
1.0	42.86	7.17	21.1	6.10	17.51	21.3	37.10	17.74	21.3	54.30	59.98	21.4	20.90	56.12
1.0	42.80	6.83	22.1	5.99	17.23	22.3	36.53	17.77	22.3	52.72	60.13	22.4	20.76	56.45
1.0	42.75	6.49	23.1	5.89	16.94	23.2	35.97	17.77	23.3	51.11	60.25	23.4	20.59	56.76
1.0	42.73	6.15	24.1	5.80	16.63	24.2	35.40	17.75	24.3	49.46	60.35	24.4	20.41	57.05
1.0	42.72	5.82	25.1	5.73	16.33	25.2	34.86	17.70	25.3	47.83	60.42	25.4	20.21	57.32
1.0	42.73	5.50	26.1	5.67	16.04	26.2	34.35	17.65	26.3	46.27	60.47	26.4	20.01	57.58
1.0	42.74	5.18	27.1	5.61	15.75	27.2	33.86	17.59	27.3	44.77	60.53	27.4	19.81	57.81
1.0	42.74	4.88	28.1	5.56	15.47	28.2	33.39	17.54	28.3	43.33	60.57	28.4	19.63	58.04
1.0	42.75	4.60	29.1	5.51	15.21	29.2	32.93	17.49	29.3	41.95	60.62	29.4	19.46	58.27
1.0	42.75	4.32	30.1	5.45	14.96	30.2	32.48	17.45	30.3	40.60	60.69	30.4	19.29	58.50
1.0	42.74	4.05	31.1	5.38	14.71	31.2	32.03	17.43	31.3	39.26	60.76	31.4	19.14	58.74

0.76	-10.72	8.56	-8.50	24.61	-24.59	74.71	-74.70	15.92	-15.89
h 45 ^m	55°.22	14 ^h 13 ^m	9°.28	18 ^h 5 ^m	0°.43	19 ^h 24 ^m	31°.66	22 ^h 15 ^m	43°.98
° 39'	43''.10	-83° 16'	47''.50	-87° 39'	52''.55	-89° 13'	43''.28	-86° 24'	3''.32

APPARENT PLACES OF CIRCUMPOLAR STARS
FOR THE UPPER TRANSIT AT WASHINGTON.

1 Octantis. Mag. 5.4			δ Octantis. Mag. 4.1			χ Octantis. Mag. 5.2			σ Octantis. Mag. 5.5			ν Octantis. Mag. 5.7		
Mean Solar Date.	Right Ascension.	Declination South.	Mean Solar Date.	Right Ascension.	Declination South.	Mean Solar Date.	Right Ascension.	Declination South.	Mean Solar Date.	Right Ascension.	Declination South.	Mean Solar Date.	Right Ascension.	Declination South.
Oct.	h m ° ' "		Oct.	h m ° ' "		Oct.	h m ° ' "		Oct.	h m ° ' "		Oct.	h m ° ' "	
	12 45 84 39			14 13 83 17			18 5 87 40			19 25 89 13			22 16 86 23	
	s " "			s " "			s " "			s " "			s " "	
1.0	42.74 64.05	1.1	5.38 14.71	1.2	32.03 17.43	1.3	99.26 60.76	1.4	19.14 58.74					
2.0	42.73 63.77	2.1	5.31 14.46	2.2	31.57 17.41	2.3	97.90 60.84	2.4	18.99 58.98					
3.0	42.71 63.48	3.1	5.24 14.21	3.2	31.10 17.40	3.3	96.50 60.93	3.4	18.84 59.24					
3.9	42.69 63.18	4.1	5.16 13.96	4.2	30.61 17.38	4.3	95.03 61.02	4.4	18.67 59.51					
4.9	42.68 62.86	5.1	5.09 13.68	5.2	30.09 17.35	5.3	93.48 61.10	5.4	18.50 59.79					
5.9	42.68 62.54	6.1	5.01 13.38	6.2	29.54 17.31	6.3	91.84 61.18	6.4	18.30 60.06					
6.9	42.69 62.20	7.1	4.95 13.06	7.2	28.98 17.23	7.3	90.12 61.22	7.4	18.06 60.33					
7.9	42.72 61.85	8.0	4.90 12.72	8.2	28.44 17.14	8.3	88.36 61.25	8.4	17.80 60.58					
8.9	42.77 61.51	9.0	4.87 12.39	9.2	27.92 17.01	9.3	86.63 61.23	9.4	17.52 60.80					
9.9	42.84 61.18	10.0	4.85 12.05	10.2	27.43 16.86	10.3	84.96 61.20	10.4	17.24 61.08					
10.9	42.92 60.88	11.0	4.84 11.74	11.2	26.97 16.71	11.3	83.42 61.14	11.4	16.97 61.17					
11.9	43.00 60.61	12.0	4.84 11.45	12.2	26.56 16.56	12.3	81.98 61.10	12.4	16.71 61.33					
12.9	43.07 60.36	13.0	4.85 11.18	13.2	26.18 16.42	13.3	80.65 61.05	13.4	16.47 61.49					
13.9	43.14 60.11	14.0	4.84 10.92	14.2	25.80 16.31	14.2	79.35 61.03	14.4	16.26 61.64					
14.9	43.19 59.86	15.0	4.82 10.67	15.2	25.41 16.22	15.2	78.03 61.02	15.4	16.06 61.82					
15.9	43.23 59.60	16.0	4.79 10.41	16.2	24.98 16.13	16.2	76.66 61.02	16.4	15.85 62.02					
16.9	43.26 59.32	17.0	4.76 10.14	17.2	24.52 16.05	17.2	75.19 61.06	17.4	15.64 62.24					
17.9	43.30 59.02	18.0	4.72 9.84	18.2	24.04 15.96	18.2	73.60 61.06	18.4	15.40 62.46					
18.9	43.35 58.70	19.0	4.69 9.52	19.2	23.53 15.83	19.2	71.92 61.05	19.4	15.14 62.69					
19.9	43.42 58.37	20.0	4.68 9.18	20.2	23.01 15.68	20.2	70.18 61.00	20.3	14.84 62.91					
20.9	43.51 58.03	21.0	4.67 8.84	21.2	22.50 15.50	21.2	68.42 60.95	21.3	14.52 63.11					
21.9	43.62 57.70	22.0	4.69 8.48	22.2	22.02 15.30	22.2	66.68 60.86	22.3	14.20 63.27					
22.9	43.75 57.39	23.0	4.71 8.13	23.2	21.56 15.09	23.2	65.02 60.76	23.3	13.86 63.43					
23.9	43.87 57.09	24.0	4.74 7.81	24.2	21.14 14.88	24.2	63.42 60.65	24.3	13.54 63.56					
24.9	44.00 56.82	25.0	4.78 7.49	25.2	20.75 14.66	25.2	61.91 60.53	25.3	13.22 63.67					
25.9	44.13 56.55	25.9	4.82 7.19	26.2	20.37 14.45	26.2	60.49 60.41	26.3	12.92 63.76					
26.9	44.25 56.31	26.9	4.86 6.90	27.2	20.01 14.26	27.2	59.11 60.31	27.3	12.63 63.89					
27.9	44.37 56.08	27.9	4.90 6.63	28.2	19.66 14.07	28.2	57.77 60.20	28.3	12.36 64.00					
28.9	44.48 55.84	28.9	4.93 6.36	29.2	19.32 13.89	29.2	56.45 60.11	29.3	12.09 64.13					
29.9	44.59 55.60	29.9	4.95 6.09	30.1	18.96 13.72	30.2	55.10 60.03	30.3	11.82 64.26					
30.9	44.69 55.35	30.9	4.98 5.81	31.1	18.58 13.55	31.2	53.71 59.95	31.3	11.55 64.39					
31.9	44.79 55.08	31.9	4.99 5.52	32.1	18.18 13.37	32.2	52.26 59.86	32.3	11.27 64.53					
10.76	-10.71	8.55	-8.50	24.61	-24.59	74.76	-74.76	15.93	-15.90					
12 ^h 45 ^m	55 ^s .22	14 ^h 13 ^m	9 ^s .28	18 ^h 5 ^m	0 ^s .43	19 ^h 24 ^m	31 ^s .66	22 ^h 15 ^m	43 ^s .98					
-84° 39'	43'' .10	-83° 16'	47'' .50	-87° 39'	52'' .55	-89° 13'	43'' .28	-86° 24'	3'' .31					

(Eph 15)

APPARENT PLACES OF CIRCUMPOLAR STARS

FOR THE UPPER TRANSIT AT WASHINGTON.

♏ Octantis. Mag. 5.4			♐ Octantis. Mag. 4.1			♑ Octantis. Mag. 5.2			♒ Octantis. Mag. 5.5			♓ Octantis. Mag. 5.7		
Mean Solar Date.	Right Ascension.	Declination South.	Mean Solar Date.	Right Ascension.	Declination South.	Mean Solar Date.	Right Ascension.	Declination South.	Mean Solar Date.	Right Ascension.	Declination South.	Mean Solar Date.	Right Ascension.	Declination South.
Nov. 12 45	h m	° '	Nov. 14 13	h m	° '	Nov. 18 5	h m	° '	Nov. 19 25	h m	° '	Nov. 22 16	h m	° '
	s	"		s	"		s	"		s	"		s	"
0.9	44.79	55.08	0.9	4.99	65.52	1.1	18.18	13.37	1.2	52.26	59.86	1.3	11.27	4.53
1.9	44.90	54.80	1.9	5.02	65.22	2.1	17.77	13.18	2.2	50.73	59.77	2.3	10.96	4.67
2.9	45.02	54.52	2.9	5.05	64.90	3.1	17.35	12.97	3.2	49.13	59.66	3.3	10.63	4.81
3.9	45.17	54.23	3.9	5.10	64.56	4.1	16.93	12.73	4.2	47.52	59.52	4.3	10.28	4.93
4.9	45.33	53.95	4.9	5.16	64.23	5.1	16.54	12.47	5.2	45.92	59.35	5.3	9.91	5.03
5.9	45.51	53.68	5.9	5.23	63.90	6.1	16.18	12.18	6.2	44.38	59.16	6.3	9.54	5.10
6.9	45.71	53.44	6.9	5.33	63.59	7.1	15.86	11.89	7.2	42.98	58.94	7.3	9.18	5.14
7.9	45.90	53.22	7.9	5.43	63.29	8.1	15.59	11.60	8.2	41.70	58.72	8.3	8.83	5.16
8.9	46.10	53.03	8.9	5.53	63.02	9.1	15.36	11.32	9.2	40.53	58.50	9.3	8.50	5.16
9.9	46.29	52.86	9.9	5.62	62.77	10.1	15.13	11.06	10.2	39.44	58.31	10.3	8.19	5.17
10.9	46.46	52.70	10.9	5.71	62.55	11.1	14.92	10.82	11.2	38.41	58.12	11.3	7.91	5.18
11.9	46.61	52.53	11.9	5.79	62.32	12.1	14.69	10.60	12.2	37.34	57.97	12.3	7.64	5.22
12.9	46.75	52.35	12.9	5.86	62.08	13.1	14.44	10.39	13.2	36.18	57.82	13.3	7.36	5.28
13.9	46.90	52.15	13.9	5.92	61.82	14.1	14.15	10.16	14.2	34.93	57.68	14.3	7.07	5.34
14.9	47.05	51.92	14.9	5.98	61.54	15.1	13.83	9.92	15.2	33.60	57.51	15.3	6.74	5.42
15.9	47.22	51.68	15.9	6.06	61.25	16.1	13.51	9.66	16.2	32.21	57.32	16.3	6.39	5.48
16.9	47.41	51.45	16.9	6.15	60.94	17.1	13.20	9.37	17.2	30.79	57.11	17.3	6.03	5.52
17.9	47.62	51.22	17.9	6.26	60.63	18.1	12.90	9.05	18.2	29.39	56.87	18.3	5.65	5.54
18.9	47.84	51.01	18.9	6.38	60.33	19.1	12.64	8.72	19.1	28.08	56.62	19.3	5.26	5.53
19.9	48.07	50.81	19.9	6.51	60.04	20.1	12.41	8.39	20.1	26.86	56.35	20.3	4.88	5.52
20.9	48.30	50.64	20.9	6.64	59.77	21.1	12.23	8.05	21.1	25.72	56.08	21.3	4.51	5.47
21.9	48.53	50.49	21.9	6.78	59.52	22.1	12.07	7.72	22.1	24.69	55.80	22.3	4.16	5.42
22.9	48.76	50.35	22.9	6.92	59.29	23.1	11.93	7.41	23.1	23.74	55.54	23.3	3.82	5.36
23.9	48.97	50.22	23.9	7.05	59.07	24.1	11.80	7.11	24.1	22.85	55.28	24.3	3.50	5.29
24.9	49.18	50.10	24.9	7.18	58.86	25.1	11.67	6.82	25.1	21.97	55.03	25.3	3.19	5.24
25.9	49.39	49.98	25.9	7.31	58.65	26.1	11.55	6.55	26.1	21.11	54.80	26.2	2.90	5.19
26.9	49.58	49.86	26.9	7.42	58.45	27.1	11.42	6.28	27.1	20.23	54.58	27.2	2.61	5.15
27.8	49.78	49.73	27.9	7.54	58.24	28.1	11.26	6.01	28.1	19.30	54.35	28.2	2.31	5.12
28.8	49.98	49.59	28.9	7.65	58.02	29.1	11.10	5.73	29.1	18.32	54.12	29.2	2.00	5.09
29.8	50.19	49.44	29.9	7.77	57.78	30.1	10.92	5.43	30.1	17.28	53.88	30.2	1.66	5.07
30.8	50.41	49.29	30.9	7.91	57.54	31.1	10.75	5.11	31.1	16.21	53.61	31.2	1.31	5.02
31.8	50.65	49.14	31.9	8.05	57.29	32.1	10.60	4.77	32.1	15.16	53.33	32.2	0.94	4.96
10.75	-10.71	8.55	-8.49	24.59	-24.57	74.67	-74.66	15.93	-15.90					
2 ^h 45 ^m	55°.22	14 ^h 13 ^m	9°.28	18 ^h 5 ^m	0°.43	19 ^h 24 ^m	31°.66	22 ^h 15 ^m	43°.98					
4° 39'	43''.10	-83° 16'	47''.50	-87° 39'	52''.55	-89° 13'	43''.28	-86° 24'	3''.31					

[Eph 13]

**APPARENT PLACES OF CIRCUMPOLAR STARS
FOR THE UPPER TRANSIT AT WASHINGTON.**

ε Octantis. Mag. 5.4			δ Octantis. Mag. 4.1			χ Octantis. Mag. 5.2			σ Octantis. Mag. 5.5			υ Octantis. Mag. 5.7		
Mean Solar Date.	Right Ascension.	Declination South.	Mean Solar Date.	Right Ascension.	Declination South.	Mean Solar Date.	Right Ascension.	Declination South.	Mean Solar Date.	Right Ascension.	Declination South.	Mean Solar Date.	Right Ascension.	Declination South.
Dec.	h m	° '	Dec.	h m	° '	Dec.	h m	° '	Dec.	h m	° '	Dec.	h m	° '
	12 45	-84 39		14 13	-83 16		18 5	-87 39		19 25	-89 13		22 15	-86 23
	s	"		s	"		s	"		s	"		s	"
0.8	50.41	49.29	0.9	7.91	57.54	1.1	10.75	65.11	1.1	16.21	53.61	1.2	61.31	65.02
1.8	50.65	49.14	1.9	8.05	57.29	2.1	10.60	64.77	2.1	15.16	53.33	2.2	60.94	64.66
2.8	50.91	49.00	2.9	8.21	57.04	3.1	10.48	64.41	3.1	14.18	53.00	3.2	60.56	64.87
3.8	51.18	48.89	3.9	8.39	56.81	4.1	10.40	64.03	4.1	13.30	52.66	4.2	60.19	64.75
4.8	51.46	48.80	4.9	8.58	56.59	5.0	10.37	63.66	5.1	12.56	52.30	5.2	59.83	64.99
5.8	51.73	48.75	5.9	8.77	56.41	6.0	10.39	63.29	6.1	11.97	51.97	6.2	59.50	64.43
6.8	51.99	48.72	6.9	8.96	56.26	7.0	10.44	62.95	7.1	11.50	51.63	7.2	59.20	64.25
7.8	52.23	48.71	7.9	9.14	56.13	8.0	10.50	62.63	8.1	11.10	51.32	8.2	58.92	64.08
8.8	52.47	48.69	8.9	9.31	56.00	9.0	10.55	62.34	9.1	10.71	51.03	9.2	58.66	63.88
9.8	52.69	48.66	9.9	9.46	55.88	10.0	10.58	62.06	10.1	10.27	50.76	10.2	58.41	63.60
10.8	52.90	48.62	10.9	9.61	55.74	11.0	10.57	61.78	11.1	9.74	50.48	11.2	58.14	63.40
11.8	53.12	48.56	11.9	9.75	55.59	12.0	10.54	61.49	12.1	9.13	50.21	12.2	57.85	63.19
12.8	53.35	48.49	12.9	9.91	55.41	13.0	10.51	61.18	13.1	8.45	49.93	13.2	57.55	63.00
13.8	53.59	48.42	13.9	10.07	55.22	14.0	10.46	60.85	14.1	7.73	49.62	14.2	57.22	62.80
14.8	53.85	48.35	14.9	10.25	55.03	15.0	10.44	60.49	15.1	7.04	49.28	15.2	56.88	62.61
15.8	54.13	48.29	15.9	10.45	54.85	16.0	10.45	60.11	16.1	6.41	48.92	16.2	56.53	62.42
16.8	54.41	48.25	16.9	10.65	54.67	17.0	10.50	59.72	17.1	5.87	48.56	17.2	56.19	62.25
17.8	54.70	48.23	17.9	10.86	54.52	18.0	10.58	59.34	18.1	5.44	48.19	18.2	55.86	62.08
18.8	54.99	48.24	18.9	11.07	54.39	19.0	10.70	58.97	19.1	5.12	47.81	19.2	55.55	61.92
19.8	55.27	48.26	19.9	11.28	54.28	20.0	10.84	58.62	20.1	4.89	47.44	20.2	55.26	61.76
20.8	55.53	48.30	20.8	11.48	54.19	21.0	11.00	58.29	21.1	4.73	47.10	21.2	55.00	61.61
21.8	55.79	48.35	21.8	11.68	54.11	22.0	11.16	57.96	22.1	4.62	46.75	22.2	54.75	61.46
22.8	56.04	48.40	22.8	11.88	54.04	23.0	11.32	57.65	23.1	4.53	46.44	23.2	54.51	61.31
23.8	56.28	48.45	23.8	12.07	53.97	23.9	11.48	57.36	24.1	4.45	46.13	24.2	54.28	61.18
24.8	56.51	48.48	24.8	12.25	53.90	24.9	11.62	57.07	25.1	4.33	45.82	25.2	54.04	61.04
25.8	56.74	48.51	25.8	12.42	53.83	25.9	11.75	56.78	26.0	4.16	45.51	26.2	53.80	60.95
26.8	56.98	48.54	26.8	12.60	53.74	26.9	11.87	56.48	27.0	3.95	45.20	27.2	53.55	60.76
27.8	57.22	48.55	27.8	12.79	53.64	27.9	11.98	56.16	28.0	3.69	44.87	28.2	53.28	60.59
28.8	57.49	48.57	28.8	12.99	53.53	28.9	12.11	55.81	29.0	3.44	44.52	29.2	52.99	60.44
29.8	57.77	48.60	29.8	13.20	53.43	29.9	12.26	55.45	30.0	3.23	44.15	30.2	52.70	60.30
30.8	58.06	48.64	30.8	13.42	53.33	30.9	12.45	55.07	31.0	3.12	43.76	31.2	52.41	59.83
31.8	58.35	48.72	31.8	13.66	53.26	31.9	12.68	54.70	32.0	3.15	43.37	32.1	52.13	59.54
10.75	-10.70		8.55	-8.49		24.56	-24.54		74.45	-74.44		15.93	-15.90	
12 ^h 45 ^m	55 ^s .22		14 ^h 13 ^m	9 ^s .28		18 ^h 5 ^m	0 ^s .43		19 ^h 24 ^m	31 ^s .66		22 ^h 15 ^m	43 ^s .98	
-84° 39'	43'' .10		-83° 16'	47'' .50		-87° 39'	52'' .55		-89° 13'	43'' .28		-86° 24'	3'' .31	

[Eph 15]

MEAN ERRORS OF NEWCOMB'S PLACES FOR 1920 OF STARS OF THE AMERICAN
EPHEMERIS AND NAUTICAL ALMANAC.

Name.	R. A. 1920.		Decl. 1920.	Mean Error 1920.		Cat. No.	Name.	R. A. 1920.		Decl. 1920.	Mean Error 1920.	
				<i>a</i>	<i>δ</i>						<i>a</i>	<i>δ</i>
33 Piscium	h	m	°	s	"		ε Sculpt.	h	m	°	s	"
α Androm.	0	1	-6	.018	.25	109	ζ Ceti	1	42	-25	.037	.46
β Cassiop.		4	+29	.010	.13	116	α Trianguli		48	-11	.020	.24
ε Phœnicis		5	+59	.017	.17	118	ε Cassiop.		49	+29	.022	.22
22 Androm.		5	-46	.051	.41	117	ε Cassiop.		49	+63	.017	.17
γ Pegasi		6	+46	.024	.28	120	ε Piscium		49	+3	.018	.23
σ Androm.	0	9	+15	.011	.14	121	β Arietis	1	50	+20	.013	.20
ζ Ceti		14	+36	.029	.33	122	ψ Phœnicis		50	-47	.080	.81
ι Tucanæ		15	-9	.014	.20	127	ν Ceti		56	-21	.025	.32
44 Piscium		16	-65	.047	.38	129	α Hydri		56	-62	.049	.34
β Hydri		21	+1	.018	.22	126	50 Cassiop.		57	+72	.016	.17
α Phœnicis	0	22	-78	....	....	131	γ Andr. pr.	1	59	+42	.016	.16
12 Ceti		22	-43	.047	.31	133	α Arietis	2	3	+23	.010	.14
13 Ceti		26	-4	.017	.21	134	β Trianguli		5	+35	.018	.21
ζ Cassiop.		31	-4	.023	.30	136	55 Cassiop.		8	+66	.025	.24
π Androm.		33	+53	.021	.20	137	6 Persei		8	+51	.025	.27
ε Androm.	0	33	+33	.021	.21	138	ξ ¹ Ceti	2	9	+8	.018	.23
δ Androm.		34	+29	.016	.19	139	μ Fornacis		9	-31	.076	.83
α Cassiop.		35	+30	.018	.22	141	γ Trianguli		13	+33	.024	.31
μ Phœnicis		36	+56	.012	.14	142	67 Ceti		13	-7	.021	.25
β Ceti	0	38	-47	....	.53	144	φ Eridani		14	-52	.049	.42
σ Cassiop.		40	-18	.013	.17	145	o Ceti	2	15	-3	.018	.23
21 Cassiop.		40	+48	.034	.26	146	κ Fornacis		19	-24	.049	.47
ζ Androm.		40	+75	.017	.24	148	δ Hydri		20	-60	....	....
η Cassiop.		43	+24	.019	.24	149	ι Cassiop.		22	+67	.025	.25
δ Piscium		44	+57	.017	.24	153	ξ ² Ceti		24	+8	.014	.19
λ Hydri	0	45	+7	.014	.20	156	σ Ceti	2	28	-16	.028	.37
20 Ceti		46	-75	....	.70	157	36 H. Cassiop.		30	+72	.021	.22
γ Cassiop.		49	-2	.018	.26	160	ν Ceti		32	+5	.020	.26
μ Androm.		52	+60	.018	.22	163	μ Hydri		33	-79	.056	.70
α Sculptoris		52	+38	.017	.21	161	ν Arietis		34	+22	.020	.26
43 H. Cephei	0	55	-30	.025	.23	165	δ Ceti	2	35	-0	.014	.20
ε Piscium		58	+86	.010	.17	172	ε Hydri		38	-60	....	....
β Phœnicis	0	59	+7	.012	.26	170	6 Persei		39	+49	.021	.19
μ Cassiop.	1	3	-47	.050	.47	173	γ Ceti seq.		39	+3	.016	.20
η Ceti		3	+55	.022	.27	174	π Ceti		40	-14	.025	.25
β Androm.	1	5	-11	.025	.22	175	μ Ceti	2	41	+10	.020	.21
τ Piscium		5	+35	.013	.17	177	η Persei		45	+56	.010	.25
ζ Piscium		7	+30	.019	.33	178	41 Arietis		45	+27	.020	.22
ι Tucanæ		10	+7	.019	.24	179	β Fornacis		46	-33	.050	.47
γ Piscium		13	-69	....	....	180	σ Arietis		47	+15	.018	.24
δ Piscium	1	14	+3	.022	.29	181	r ² Eridani	2	47	-21	.022	.32
ν Piscium		15	+27	.022	.25	182	τ Persei		49	+52	.020	.19
θ Ceti		20	-9	.013	.19	183	η Eridani		53	-9	.016	.21
δ Cassiop.		21	+60	.018	.19	185	ε Arietis		55	+21	.016	.23
γ Phœnicis		25	-44	.044	.35	187	θ Eridani		55	-41	.056	.42
38 Cassiop.	1	25	+70	.026	.28	184	47 H. Cephei	2	55	+79	.035	.32
η Piscium		27	+15	.020	.19	189	α Ceti		58	+4	.010	.13
α Urs. Min.		32	+89	....	....	191	r ³ Eridani		59	-24	.029	.32
40 Cassiop.		32	+73	.028	.25	190	γ Persei	2	59	+53	.029	.20
ν Androm.		32	+41	.024	.26	192	ρ Persei	3	0	+39	.019	.24
π Piscium	1	33	+12	.022	.25	194	μ Horologii	3	2	-60	.060	.49
ν Persei		33	+48	.018	.19	197	θ Hydri		2	-72	.046	.47
α Eridani		35	-58	....	....	195	β Persei		3	+41	.016	.20
ω Cassiop.		36	+68	.025	.25	199	δ Arietis		7	+19	.014	.17
ν Piscium		37	+5	.014	.20	202	12 Eridani		9	-29	.022	.30
φ Persei	1	39	+50	.022	.20	200	48 H. Cephei	3	10	+77	.032	.32
τ Ceti		40	-16	.020	.25	203	ζ Arietis		10	+21	.018	.26
o Piscium		41	+9	.013	.19	204	38 Horologii(G.)		11	-58	....	....
4 Octantis(G.)	1	42	-85	.039	.40	206	ζ Eridani	3	12	-9	.022	.31

AT TRANSIT OF MOON'S CENTER OVER THE MERIDIAN OF WASHINGTON.

Date.	Culmination.	Mean Time of Transit.	Diff. for 1 Hour of Long.	Right Ascension of Center.	Diff. for 1 Hour of Long.	Geocentric Declination of Center.	Diff. for 1 Hour of Long.	Sid. Time of Semid. Passing Meridian.	Geocentric Semidiameter.	Equatorial Horizontal Parallax.	Br. Lin.
		h m	m	h m s	s	" ' "	"	s	" ' "	" ' "	
Feb. 15	U	1 23.77	1.793	23 2 29.11	117.77	- 4 19 10.3	+ 924.4	63.67	15 22.1	56 18.	I.
15	L	13 45.08	1.759	23 25 49.09	115.70	- 1 14 24.9	921.6	63.11	15 17.0	55 59.	I.
16	U	2 6.04	1.737	23 48 48.67	114.36	+ 1 48 50.6	909.6	62.76	15 12.0	55 41.	I.
16	L	14 26.81	1.726	0 11 36.45	113.72	4 48 51.5	889.3	62.62	15 7.3	55 23.	I.
17	U	2 47.52	1.727	0 34 20.78	113.77	+ 7 44 3.4	+ 861.4	62.67	15 2.9	55 7.	I.
17	L	15 8.31	1.739	0 57 9.60	114.48	10 32 57.9	826.4	62.89	14 58.9	54 53.	I.
18	U	3 29.29	1.760	1 20 10.43	115.78	13 14 11.4	784.6	63.30	14 55.5	54 40.	I.
18	L	15 50.59	1.791	1 43 30.29	117.63	15 46 22.7	736.0	63.86	14 52.6	54 30.	I.
19	U	4 12.31	1.830	2 7 15.50	119.98	+18 8 10.4	+ 680.7	64.54	14 50.3	54 21.	I.
19	L	16 34.55	1.876	2 31 31.53	122.75	20 18 12.2	618.4	65.33	14 48.8	54 16.	I.
20	U	4 57.37	1.928	2 56 22.80	125.83	22 15 4.2	549.0	66.19	14 47.9	54 12.	I.
20	L	17 20.83	1.982	3 21 52.30	129.10	23 57 19.5	472.3	67.09	14 47.8	54 12.5	I.
21	U	5 44.94	2.037	3 48 1.42	132.41	+25 23 30.3	+ 388.3	67.98	14 48.5	54 15.0	I.
21	L	18 9.70	2.089	4 14 49.51	135.57	26 32 9.5	297.1	68.82	14 50.0	54 20.4	I.
22	U	6 35.07	2.137	4 42 13.78	138.41	27 21 53.8	199.2	69.55	14 52.2	54 28.5	I.
22	L	19 0.95	2.176	5 10 9.27	140.75	27 51 27.1	+ 95.5	70.13	14 55.1	54 39.4	I.
23	U	7 27.24	2.204	5 38 29.02	142.43	+27 59 46.4	- 12.9	70.54	14 58.8	54 52.9	I.
23	L	19 53.79	2.219	6 7 4.54	143.36	27 46 5.4	124.3	70.76	15 3.2	55 8.8	I.
24	U	8 20.44	2.221	6 35 46.48	143.50	27 9 58.8	236.8	70.76	15 8.1	55 27.0	I.
24	L	20 47.05	2.211	7 4 25.58	142.89	26 11 25.4	348.4	70.57	15 13.6	55 47.0	I.
25	U	9 13.47	2.190	7 32 53.38	141.64	+24 50 48.9	- 457.0	70.20	15 19.4	56 8.6	I.
25	L	21 39.59	2.163	8 1 3.08	139.91	23 8 57.0	500.6	69.72	15 25.6	56 31.3	I.
26	U	10 5.33	2.128	8 28 49.98	137.88	21 7 0.8	657.4	69.16	15 32.0	56 54.8	I.
26	L	22 30.65	2.092	8 56 11.71	135.75	18 46 31.0	745.9	68.58	15 38.5	57 18.4	I.
27	U	10 55.55	2.059	9 23 8.37	133.72	+16 9 15.8	- 824.8	68.02	15 44.9	57 41.8	I.
27	L	23 20.08	2.030	9 49 42.19	131.97	13 17 18.8	892.8	67.53	15 51.0	58 4.4	I.
28	U	11 44.29	2.008	10 15 57.35	130.64	10 12 56.0	948.9	67.17	15 56.8	58 25.6	I.
Mar. 1	L	0 8.29	1.994	10 41 59.68	129.85	6 58 34.7	992.3	66.95	16 2.1	58 45.1	I.
1	U	12 32.20	1.992	11 7 56.23	129.70	+ 3 36 52.6	-1022.2	66.91	16 6.8	59 2.4	I.
2	L	0 56.14	2.001	11 33 55.09	130.24	+ 0 10 36.2	1037.9	67.06	16 10.8	59 17.2	I.
2	U	13 20.27	2.023	12 0 4.93	131.53	- 3 17 18.3	1038.6	67.42	16 14.1	59 29.2	I.
3	L	1 44.73	2.056	12 26 34.85	133.58	6 43 47.3	1023.6	67.99	16 16.6	59 38.2	I.
3	U	14 9.68	2.103	12 53 33.89	136.38	-10 5 39.3	- 992.3	68.75	16 18.2	59 44.2	I.
4	L	2 35.25	2.161	13 21 10.65	139.85	13 19 35.8	944.3	69.68	16 19.0	59 47.3	I.
4	U	15 1.57	2.228	13 49 32.63	143.89	16 22 13.4	879.1	70.75	16 19.1	59 47.6	I.
5	L	3 28.74	2.301	14 18 45.63	148.32	19 10 6.7	796.9	71.91	16 18.5	59 45.2	I.
5	U	15 56.81	2.377	14 48 52.75	152.86	-21 39 52.3	- 698.0	73.08	16 17.2	59 40.5	I.
6	L	4 25.77	2.449	15 19 53.50	157.19	23 48 15.7	583.5	74.18	16 15.4	59 33.7	I.
6	U	16 55.54	2.511	15 51 43.01	160.93	25 32 20.5	455.3	75.11	16 13.0	59 25.1	I.
7	L	5 25.97	2.556	16 24 11.72	163.65	26 49 39.7	316.4	75.79	16 10.3	59 15.1	I.
7	U	17 56.81	2.590	16 57 5.58	165.06	-27 38 26.9	- 170.7	76.13	16 7.3	59 4.0	I.
8	L	6 27.78	2.577	17 30 7.05	164.91	27 57 46.5	- 22.6	76.09	16 3.9	58 51.8	I.
8	U	18 58.56	2.549	18 2 57.22	163.18	27 47 40.0	+ 122.9	75.66	16 0.4	58 38.9	I.
9	L	7 28.85	2.496	18 35 17.74	160.01	27 9 3.7	261.9	74.87	15 56.8	58 25.5	I.
9	U	19 58.38	2.424	19 6 52.91	155.69	-26 3 44.0	+ 389.6	73.78	15 53.0	58 11.6	I.

Defective Illumination of N. 0".02.

Feb. 28, U Defective Illumination of

[Eph 15]

I ERRORS OF NEWCOMB'S PLACES FOR 1920 OF STARS OF THE AMERICAN
EPHEMERIS AND NAUTICAL ALMANAC.

Name.	R. A. 1920.	Decl. 1920.	Mean Error 1920.		Cat. No.	Name.	R. A. 1920.	Decl. 1920.	Mean Error 1920.	
			α	δ					α	δ
ϵ Gemin.	h 39	+25	.014	.19	536	30 Monoc.	h 22	-4	.017	.23
ξ Gemin.	41	+13	.013	.21	539	θ Chamæl.	23	-77	.050	.40
ψ^5 Aurigæ	41	+44	.029	.24	537	σ Urs. Maj.	24	+61	.014	.15
α Can. Maj.	42	-17	. . . .	.16	543	Gr. 1450	28	+38	.047	.43
δ Monoc.	44	+3	.020	.25	544	η Cancri	28	+21	.019	.20
13 Camelop.	6 45	+69	.027	.24	545	Gr. 1446	8 31	+74	.032	.38
ζ Mensæ	47	-81	.048	.47	547	δ Hydræ	33	+6	.019	.26
α Pictoris	47	-62	.061	.63	548	σ Hydræ	35	+4	.023	.27
θ Gemin.	48	+34	.020	.22	554	γ Cancri	39	+22	.016	.21
τ Argûs	48	-51	.069	.64	556	δ Cancri	40	+18	.017	.21
15 Lyncis	6 50	+59	.023	.21	557	α Pyxidid	8 40	-33	.053	.42
θ Can. Maj.	50	-12	.021	.31	558	ι Cancri	42	+29	.025	.26
ϵ Can. Maj.	55	-29	.017	.23	560	δ Argûs	42	-54	.053	.41
ζ Gemin.	6 59	+21	.016	.19	559	ϵ Hydræ	43	+7	.014	.19
σ^2 Can. Maj.	7 0	-24	.025	.29	566	σ^2 Cancri	49	+31	.022	.31
γ Can. Maj.	7 0	-16	.021	.28	567	ζ Hydræ	8 51	+6	.018	.24
11 H. Cephei	4	+87	. . . .	. . .	569	ι Urs. Maj.	54	+48	.016	.17
δ Can. Maj.	5	-26	.020	.24	571	α Cancri	54	+12	.015	.20
13 Aurigæ	6	+39	.021	.26	574	b^1 Carinæ	55	-59	.044	.43
11 Gemin.	9	+16	.023	.37	576	κ Urs. Maj.	8 58	+47	.018	.19
γ^2 Volantis	7 9	-70	.071	.64	582	σ^2 Urs. Maj.	9 3	+67	.020	.28
λ Gemin.	13	+17	.013	.22	583	κ Cancri	3	+11	.016	.22
π Argûs	14	-37	.046	.34	585	λ Argûs	5	-43	.039	.32
15 H. Camel.	14	+83	.025	.24	590	ζ Octantis	9	-85	.041	.38
γ Octant. (G.)	15	-87	.053	.46	589	θ Hydræ	10	+3	.014	.19
δ Gemin.	7 15	+22	.014	.17	591	β Argûs	9 12	-69	.035	.28
δ Volantis	17	-68	.061	.64	593	83 Cancri	15	+18	.018	.24
ι Gemin.	21	+28	.014	.22	594	ι Argûs	15	-59	. . . .	. . .
η Can. Maj.	21	-29	.021	.25	595	40 Lyncis	16	+35	.018	.21
Gr. 1308	23	+69	.028	.26	596	θ Pyxidid	18	-26	.046	.61
β Can. Min.	7 23	+8	.014	.19	599	α Hydræ	9 24	-8	.010	.15
ρ Gemin.	24	+32	.021	.27	601	h Urs. Maj.	25	+63	.019	.19
σ Argûs	27	-43	.060	.46	600	ι H. Draco.	26	+82	.016	.20
α^2 Gemin.	29	+32	.019	.14	603	d Urs. Maj.	27	+70	.025	.24
15 Monoc.	33	-4	.040	.42	604	θ Urs. Maj.	28	+52	.017	.17
α Can. Min.	7 35	+5	. . . .	.15	606	ψ Argûs	9 28	-40	.056	.51
14 Lyncis	36	+59	.033	.29	605	ξ Leonis	28	+12	.024	.30
κ Gemin.	40	+25	.018	.22	607	10 Leo. Min.	29	+37	.020	.27
β Gemin.	40	+28	.010	.12	620	ζ Chamæl.	36	-81	.047	.48
4 Puppis	42	-14	.028	.36	619	σ Leonis	37	+10	.014	.16
ξ Argûs	7 46	-25	.021	.27	622	θ Antliæ	9 41	-27	.057	.49
ϕ Gemin.	49	+27	.018	.28	623	ϵ Leonis	41	+24	.014	.17
16 Lyncis	49	+48	.022	.30	627	v Argûs	45	-65	.049	.38
Gr. 1374	51	+74	.029	.32	626	u Urs. Maj.	45	+59	.013	.17
χ Argûs	55	-53	.052	.40	629	6 Sextantis	47	-4	.030	.35
ω Cancri	7 56	+26	.022	.30	630	μ Leonis	9 48	+26	.014	.19
χ Gemin.	7 59	+28	.018	.24	632	Gr. 1586	51	+73	.026	.32
17 Lyncis	8 2	+52	.022	.23	634	19 Leo. Min.	53	+41	.022	.24
ρ Argûs	4	-24	.018	.24	636	ϕ Argûs	54	-54	.045	.37
3 H. Ur. Maj.	5	+69	.025	.29	638	π Leonis	9 56	+8	.012	.20
γ Argûs	8 7	-47	.051	.44	641	η Leonis	10 3	+17	.022	.22
ζ Cancri	8	+18	.022	.25	642	α Leonis	4	+12	.015	.13
Br. 1147	10	+76	.026	.31	644	λ Hydræ	7	-12	.019	.24
10 Puppis	10	-16	.023	.32	645	ϕ Vellorum	11	-42	.088	.76
β Cancri	12	+9	.013	.24	646	32 Urs. Maj.	12	+66	.024	.25
11 Lyncis	8 17	+43	.027	.22	648	ζ Leonis	10 12	+24	.018	.22
Gr. 1119	19	+89	.025	. . .	647	λ Urs. Maj.	12	+43	.017	.16
d^1 Cancri	19	+19	.022	.29	653	γ Leonis pr.	16	+20	.019	.15
ϵ Argûs	8 21	-59	.038	.33	657	μ Urs. Maj.	10 18	+42	.016	.19

AT TRANSIT OF MOON'S CENTER OVER THE MERIDIAN OF WASHINGTON.

Date.	Culmination.	Mean Time of Transit.	Diff. for 1 Hour of Long.	Right Ascension of Center.	Diff. for 1 Hour of Long.	Geocentric Declination of Center.	Diff. for 1 Hour of Long.	Sid. Time of Semid. Passing Meridian.	Geocentric Semidiameter.	Equatorial Horizontal Parallax.	Bright Limb.
		h m	m	h m s	s	° ' "	"	s	' "	' "	
Apr. 1	L	1 17.38	2.319	13 53 29.44	149.38	-16 40 45.2	-893.7	72.02	16 33.6	60 40.7	II.
1	U	13 45.71	2.402	14 23 52.04	154.39	19 30 55.9	804.7	73.29	16 33.5	60 40.4	II.
2	L	2 15.03	2.483	14 55 14.34	159.27	22 1 18.5	696.0	74.52	16 32.3	60 35.8	II.
2	U	14 45.28	2.556	15 27 32.71	163.63	24 8 9.2	569.7	75.61	16 30.0	60 27.3	II.
3	L	3 16.32	2.613	16 0 38.20	167.05	-25 48 13.9	-429.0	76.46	16 26.7	60 15.4	II.
3	U	15 47.90	2.646	16 34 16.42	169.05	26 59 4.4	278.2	76.97	16 22.7	60 0.5	II.
4	L	4 19.71	2.651	17 8 8.61	169.34	27 39 12.0	-122.8	77.06	16 17.9	59 43.2	II.
4	U	16 51.40	2.626	17 41 53.50	167.82	27 48 15.8	+31.5	76.73	16 12.7	59 24.1	II.
5	L	5 22.61	2.573	18 15 9.92	164.63	-27 27 2.4	+179.3	75.98	16 7.2	59 3.8	II.N.
5	U	17 53.05	2.497	18 47 39.33	160.06	26 37 18.7	316.0	74.88	16 1.4	58 42.7	II.N.
6	L	6 22.47	2.405	19 19 7.62	154.53	25 21 36.7	438.6	73.53	15 55.6	58 21.3	II.N.
6	U	18 50.73	2.304	19 49 26.03	148.49	23 42 56.1	545.5	72.01	15 49.8	58 0.0	II.N.
7	L	7 17.77	2.202	20 18 31.00	142.36	-21 44 29.2	+636.3	70.44	15 44.1	57 39.0	II.N.
7	U	19 43.60	2.103	20 46 23.46	136.45	19 29 27.4	711.5	68.89	15 38.5	57 18.6	II.N.
8	L	8 8.30	2.014	21 13 7.68	131.01	17 0 52.7	772.0	67.43	15 33.2	56 59.0	II.N.
8	U	20 31.97	1.934	21 38 50.31	126.20	14 21 32.2	819.1	66.11	15 28.1	56 40.3	II.N.
9	L	8 54.75	1.866	22 3 39.37	122.10	-11 34 0.0	+854.2	64.95	15 23.2	56 22.4	II.N.
9	U	21 16.79	1.810	22 27 43.70	118.74	8 40 34.0	878.3	63.99	15 18.6	56 5.5	II.N.
10	L	9 38.24	1.767	22 51 12.30	116.14	5 43 19.3	892.5	63.23	15 14.3	55 49.6	II.N.
10	U	21 59.24	1.736	23 14 14.16	114.28	-2 44 10.7	897.4	62.69	15 10.2	55 34.7	II.N.
11	L	10 19.95	1.717	23 36 58.06	113.14	+0 15 5.6	+893.8	62.33	15 6.4	55 20.7	II.N.
11	U	22 40.49	1.709	23 59 32.43	112.69	3 12 50.1	882.1	62.17	15 2.8	55 7.6	II.N.
12	L	11 1.01	1.713	0 22 5.24	112.88	6 7 26.5	862.6	62.21	14 59.6	54 55.6	
12	U	23 21.63	1.726	0 44 44.07	113.68	8 57 21.2	835.3	62.42	14 56.5	54 44.5	
13	L	11 42.47	1.748	1 7 35.86	115.03	+11 41 2.3	+800.2	62.79	14 53.8	54 34.4	
14	U	0 3.62	1.779	1 30 46.94	116.89	14 16 56.6	737.5	63.31	14 51.3	54 25.4	
14	L	12 25.19	1.817	1 54 22.93	119.18	16 43 31.6	707.0	63.95	14 49.2	54 17.5	
15	U	0 47.25	1.860	2 18 28.41	121.80	18 59 13.7	648.7	64.68	14 47.4	54 10.9	
15	L	13 9.86	1.908	2 43 6.80	124.64	+21 2 29.1	+582.6	65.48	14 46.0	54 5.7	I.
16	U	1 33.05	1.957	3 8 20.13	127.59	22 51 44.9	508.8	66.30	14 45.0	54 2.0	I.
16	L	13 56.82	2.005	3 34 8.75	130.50	24 25 31.0	427.7	67.10	14 44.4	53 59.9	I.
17	U	2 21.15	2.050	4 0 31.14	133.19	25 42 22.7	339.8	67.85	14 44.3	53 59.0	I.
17	L	14 45.99	2.089	4 27 23.87	135.52	+26 41 3.5	+246.0	68.50	14 44.7	54 1.2	I.
18	U	3 11.25	2.119	4 54 41.69	137.34	27 20 28.2	147.4	69.01	14 45.7	54 0.9	I.
18	L	15 36.81	2.139	5 22 17.80	138.56	27 39 47.0	+45.3	69.37	14 47.4	54 10.8	I.
19	U	4 2.54	2.148	5 50 4.38	139.09	27 38 26.9	-58.8	69.53	14 49.6	54 19.1	I.
19	L	16 28.31	2.145	6 17 53.13	138.93	+27 16 14.1	-163.2	69.52	14 52.5	54 29.8	I.
20	U	4 53.99	2.132	6 45 36.22	138.16	26 33 14.0	266.4	69.35	14 56.1	54 43.0	I.
20	L	17 19.46	2.111	7 13 6.75	136.86	25 29 49.9	367.1	69.03	15 0.4	54 58.7	I.
21	U	5 44.63	2.083	7 40 19.41	135.21	24 6 41.4	463.8	68.61	15 5.4	55 16.9	I.
21	L	18 9.45	2.053	8 7 10.86	133.35	+22 24 41.6	-555.5	68.13	15 11.0	55 37.5	I.
22	U	6 33.89	2.022	8 33 39.86	131.49	20 24 54.4	641.4	67.63	15 17.3	56 0.5	I.
22	L	18 57.98	1.993	8 59 47.25	129.78	18 8 32.7	721.0	67.17	15 24.1	56 25.6	I.
23	U	7 21.75	1.970	9 25 35.83	128.37	15 36 56.8	793.7	66.77	15 31.4	56 52.5	I.
23	L	19 45.29	1.954	9 51 10.19	127.43	+12 51 34.7	-858.7	66.49	15 39.2	57 20.9	I.

AT TRANSIT OF MOON'S CENTER OVER THE MERIDIAN OF WASHINGTON.

Date.	Culmination.	Mean Time of Transit.	Diff. for 1 Hour of Long.	Right Ascension of Center.	Diff. for 1 Hour of Long.	Geocentric Declination of Center.	Diff. for 1 Hour of Long.	Sid. Time of Semid. Passing Meridian.	Geocentric Semidiameter.	Equatorial Horizontal Parallax.	Bright Limbs.
		h m	m	h m s	s	° ' "	"	s	' "	' "	
Apr. 23	L	19 45.29	1.954	9 51 10.19	127.43	+12 51 34.7	- 858.7	66.49	15 39.2	57 20.9	I. N.
24	U	8 8.69	1.948	10 16 36.38	127.04	9 54 2.4	915.2	66.36	15 47.2	57 50.4	I. N.
24	L	20 32.08	1.952	10 42 1.75	127.31	6 46 6.2	962.4	66.41	15 55.4	58 20.4	I. N.
25	U	8 55.59	1.969	11 7 34.77	128.32	3 29 45.1	999.1	66.65	16 3.5	58 50.2	I. N.
25	L	21 19.39	1.999	11 33 24.74	130.15	+ 0 7 14.5	-1023.8	67.10	16 11.4	59 19.3	I. N.
26	U	9 43.63	2.044	11 59 41.66	132.82	- 3 18 51.4	1034.7	67.78	16 18.9	59 46.7	I. N.
26	L	22 8.50	2.103	12 26 35.91	136.36	6 45 35.7	1029.9	68.68	16 25.7	60 11.8	I. N.
27	U	10 34.15	2.176	12 54 17.78	140.75	10 9 37.2	1007.2	69.79	16 31.7	60 33.8	I. N.
27	L	23 0.76	2.261	13 22 56.92	145.88	-13 27 9.1	- 964.6	71.09	16 36.7	60 51.9	I. N.S.
28	U	11 28.46	2.356	13 52 41.42	151.60	16 34 1.7	900.4	72.51	16 40.4	61 5.5	I. S.
28	L	23 57.33	2.456	14 23 36.65	157.61	19 25 47.9	813.4	73.98	16 42.7	61 14.1	I. II. S.
29	U	12 27.39	2.554	14 55 43.81	163.51	21 57 54.1	703.8	75.41	16 43.6	61 17.5	II. S.
30	L	0 58.58	2.641	15 28 58.51	168.77	-24 5 55.9	- 573.1	76.69	16 43.1	61 15.5	II. S.
30	U	13 30.71	2.709	16 3 9.65	172.83	25 45 58.7	424.8	77.67	16 41.1	61 8.3	II. S.
May 1	L	2 3.48	2.747	16 37 59.39	175.13	26 55 1.5	264.2	78.24	16 37.9	60 56.3	II. S.
1	U	14 36.50	2.750	17 13 4.41	175.32	27 31 17.5	- 98.9	78.31	16 33.4	60 39.9	II. S.
2	L	3 9.34	2.717	17 47 58.55	173.34	-27 34 25.5	+ 65.9	77.87	16 27.9	60 19.9	II. S.
2	U	15 41.58	2.651	18 22 16.37	169.33	27 5 31.3	221.2	76.97	16 21.7	59 57.0	II. N.S.
3	L	4 12.85	2.558	18 55 36.29	163.76	26 6 54.0	362.3	75.67	16 14.8	59 31.9	II. N.
3	U	16 42.91	2.449	19 27 42.91	157.21	24 41 45.6	486.0	74.10	16 7.6	59 5.4	II. N.
4	L	5 11.61	2.333	19 58 27.61	150.21	-22 53 45.5	+ 590.9	72.39	16 0.2	58 38.2	II. N.
4	U	17 38.90	2.217	20 27 48.09	143.24	20 46 40.2	677.0	70.64	15 52.8	58 10.9	II. N.
5	L	6 4.84	2.108	20 55 47.07	136.67	18 24 7.4	745.6	68.95	15 45.5	57 44.1	II. N.
5	U	18 29.53	2.009	21 22 30.90	130.75	15 49 26.2	798.6	67.39	15 38.4	57 18.1	II. N.
6	L	6 53.12	1.924	21 48 8.11	125.60	-13 5 34.0	+ 837.8	65.99	15 31.6	56 53.3	II. N.
6	U	19 15.76	1.852	22 12 48.45	121.28	10 15 6.0	864.9	64.79	15 25.2	56 29.9	II. N.
7	L	7 37.62	1.794	22 36 42.13	117.83	7 20 16.7	881.6	63.82	15 19.3	56 8.1	II. N.
7	U	19 58.88	1.751	22 59 59.39	115.21	4 23 4.9	829.0	63.05	15 13.8	55 48.0	II. N.
8	L	8 19.70	1.721	23 22 50.16	113.40	- 1 25 14.9	+ 888.0	62.51	15 8.8	55 29.7	II. N.
8	U	20 40.23	1.704	23 45 23.93	112.36	+ 1 31 37.8	879.5	62.19	15 4.3	55 13.1	II. N.
9	L	9 0.63	1.699	0 7 49.77	112.07	4 26 4.5	863.7	62.07	15 0.3	54 58.2	II. N.
9	U	21 21.05	1.705	0 30 16.13	112.45	7 16 39.5	840.9	62.15	14 56.7	54 45.1	II. N.
10	L	9 41.60	1.722	0 52 50.93	113.46	+10 1 58.6	+ 811.1	62.41	14 53.6	54 33.6	II. N.
10	U	22 2.41	1.748	1 15 41.40	115.04	12 40 36.9	774.1	62.82	14 50.9	54 23.7	II. N.
11	L	10 23.59	1.783	1 38 54.03	117.14	15 11 7.0	729.8	63.38	14 48.6	54 15.4	II. N.
11	U	22 45.23	1.825	2 2 34.39	119.66	17 31 59.4	677.8	64.05	14 46.7	54 8.5	II. N.
12	L	11 7.41	1.872	2 26 46.94	122.49	+19 41 41.8	+ 618.0	64.81	14 45.2	54 3.0	
12	U	23 30.17	1.922	2 51 34.70	125.50	21 38 39.7	550.3	65.62	14 44.1	53 59.0	
13	L	11 53.54	1.973	3 16 59.11	128.55	23 21 18.8	474.9	66.44	14 43.4	53 56.4	
14	U	0 17.52	2.022	3 42 59.62	131.48	24 48 7.4	392.0	67.22	14 43.1	53 55.2	
14	L	12 42.05	2.065	4 9 33.65	134.11	+25 57 39.7	+ 302.4	67.93	14 43.2	53 55.5	
15	U	1 7.05	2.101	4 36 36.49	136.27	26 48 40.3	207.0	68.51	14 43.7	53 57.3	I. S.
15	L	13 32.43	2.126	5 4 1.52	137.80	27 20 7.8	107.1	68.93	14 44.6	54 0.6	I. S.
16	U	1 58.04	2.140	5 31 40.60	138.59	27 31 19.4	+ 4.5	69.16	14 45.9	54 5.6	I. S.
16	L	14 23.74	2.141	5 59 24.83	138.64	+27 21 52.9	- 99.0	69.21	14 47.8	54 12.3	I. S.

May 2, U Defective Illumination of N. 0".11.

[Eph 15]

AT TRANSIT OF MOON'S CENTER OVER THE MERIDIAN OF WASHINGTON.

Date.	Culmination.	Mean Time of Transit.	Diff. for 1 Hour of Long.	Right Ascension of Center.	Diff. for 1 Hour of Long.	Geocentric Declination of Center.	Diff. for 1 Hour of Long.	Sid. Time of Semid. Passing Meridian.	Geocentric Semidiameter.	Equatorial Horizontal Parallax.	Bright Limbs.
		h m	m	h m s	s	° ' "	"	s	' "	' "	
May 16	L	14 23.74	2.141	5 59 24.83	138.64	+27 21 52.9	-99.0	69.21	14 47.8	54 12.3	I. S.
17	U	2 49.37	2.139	6 27 5.16	137.97	26 51 47.9	201.6	69.07	14 50.1	54 20.9	I. S.
17	L	15 14.80	2.107	6 54 33.37	136.63	26 1 25.3	301.7	68.76	14 52.9	54 31.3	I. N.
18	U	3 39.91	2.077	7 21 42.62	134.83	24 51 24.9	397.7	68.32	14 56.3	54 43.7	I. N.
18	L	16 4.63	2.042	7 48 28.06	132.71	+23 22 42.2	-488.5	67.80	15 0.3	54 58.2	I. N.
19	U	4 28.91	2.004	8 14 47.06	130.46	21 36 24.2	573.4	67.23	15 4.8	55 14.7	I. N.
19	L	16 52.74	1.968	8 40 39.21	128.26	19 33 46.5	651.8	66.67	15 9.9	55 33.4	I. N.
20	U	5 16.16	1.935	9 6 6.31	126.31	17 16 9.6	723.2	66.16	15 15.5	55 54.1	I. N.
20	L	17 39.22	1.909	9 31 12.03	124.73	+14 44 57.6	-787.5	65.74	15 21.7	56 16.8	I. N.
21	U	6 2.01	1.891	9 56 1.69	123.66	12 1 37.6	844.5	65.45	15 28.4	56 41.4	I. N.
21	L	18 24.65	1.884	10 20 42.13	123.20	9 7 39.9	893.7	65.33	15 35.5	57 7.6	I. N.
22	U	6 47.27	1.888	10 45 21.30	123.46	6 4 40.4	934.7	65.39	15 43.0	57 35.1	I. N.
22	L	19 10.02	1.905	11 10 8.21	124.50	+ 2 54 22.4	-966.6	65.66	15 50.8	58 3.6	I. N.
23	U	7 33.06	1.937	11 35 12.78	126.40	- 0 21 18.9	988.4	66.16	15 58.7	58 32.6	I. N.
23	L	19 56.57	1.984	12 0 45.57	129.21	3 40 13.2	998.5	66.89	16 6.6	59 1.6	I. N.
24	U	8 20.74	2.046	12 26 57.70	132.96	6 59 50.3	995.2	67.86	16 14.3	59 29.9	I. N.
24	L	20 45.74	2.124	12 54 0.45	137.65	-10 17 16.1	-976.3	69.05	16 21.6	59 56.7	I. N.
25	U	9 11.77	2.216	13 22 4.68	143.20	13 29 8.7	939.3	70.45	16 28.3	60 21.3	I. N.
25	L	21 38.98	2.321	13 51 20.12	149.47	16 31 38.2	882.0	72.01	16 34.2	60 43.0	I. N.
26	U	10 7.50	2.433	14 21 54.03	156.22	19 20 27.9	802.4	73.66	16 39.1	61 0.9	I. N.
26	L	22 37.37	2.546	14 53 49.76	163.03	-21 51 2.3	-699.4	75.29	16 42.8	61 14.3	I. N.S.
27	U	11 8.57	2.651	15 27 4.89	169.36	23 58 41.4	573.4	76.79	16 45.1	61 22.7	I. S.
27	L	23 40.92	2.737	16 1 29.83	174.54	25 39 1.7	426.9	78.00	16 45.9	61 25.7	I. S.
28	U	12 14.15	2.794	16 36 47.05	177.96	26 48 23.3	264.7	78.79	16 45.2	61 23.2	II. S.
29	L	0 47.83	2.813	17 12 31.98	179.11	-27 24 18.6	-93.7	79.07	16 43.0	61 15.1	II. S.
29	U	13 21.50	2.791	17 48 15.69	177.77	27 25 52.4	+ 77.6	78.77	16 39.4	61 1.8	II. S.
30	L	1 54.66	2.730	18 23 28.86	174.06	26 53 49.9	241.0	77.93	16 34.5	60 43.8	II. N.S.
30	U	14 26.88	2.637	18 57 45.85	168.48	25 50 26.6	389.9	76.65	16 28.5	60 21.9	II. N.S.
31	L	2 57.85	2.523	19 30 47.63	161.65	-24 19 6.6	+519.9	75.04	16 21.6	59 56.8	II. N.
31	U	15 27.39	2.399	20 2 23.04	154.20	22 23 53.6	628.7	73.25	16 14.1	59 29.3	II. N.
June 1	L	3 55.43	2.275	20 32 28.32	146.71	20 9 3.3	716.3	71.41	16 6.2	59 0.3	II. N.
1	U	16 22.01	2.157	21 1 5.76	139.61	17 38 43.0	784.0	69.63	15 58.1	58 30.5	II. N.
2	L	4 47.24	2.050	21 28 21.86	133.19	-14 56 38.8	+834.0	67.98	15 50.0	58 0.7	II. N.
2	U	17 11.27	1.957	21 54 25.78	127.61	12 6 10.1	868.5	66.50	15 42.0	57 31.3	II. N.
3	L	5 34.27	1.879	22 19 28.03	122.94	9 10 7.4	889.8	65.25	15 34.3	57 3.0	II. N.
3	U	17 56.43	1.817	22 43 39.73	119.18	6 10 56.9	900.1	64.22	15 27.0	56 36.1	II. N.
4	L	6 17.94	1.770	23 7 11.85	116.32	- 3 10 41.9	+900.9	63.42	15 20.1	56 11.0	II. N.
4	U	18 38.96	1.737	23 30 15.06	114.35	- 0 11 8.9	893.3	62.86	15 13.8	55 47.9	II. N.
5	L	6 59.68	1.718	23 52 59.58	113.20	+ 2 46 8.6	878.4	62.52	15 8.1	55 27.0	II. N.
5	U	19 20.24	1.711	0 15 34.99	112.82	5 39 46.0	856.7	62.39	15 3.0	55 8.3	II. N.
6	L	7 40.80	1.717	0 38 10.27	113.18	+ 8 28 23.5	+828.5	62.46	14 58.5	54 51.8	II. N.
6	U	20 1.50	1.734	1 0 53.81	114.19	11 10 44.0	793.9	62.72	14 54.6	54 37.6	II. N.
7	L	8 22.46	1.761	1 23 53.20	115.81	13 45 29.3	752.7	63.15	14 51.4	54 25.6	II. N.
7	U	20 43.80	1.797	1 47 15.23	117.96	16 11 19.4	704.6	63.71	14 48.7	54 15.8	II. N.
8	L	9 5.61	1.840	2 11 5.73	120.54	+18 26 50.5	+649.4	64.39	14 46.6	54 8.1	II. N.

TRANSIT OF MOON'S CENTER OVER THE MERIDIAN OF WASHINGTON.

Culmination.	Mean Time of Transit.	Diff. for 1 Hour of Long.	Right Ascension of Center.	Diff. for 1 Hour of Long.	Geocentric Declination of Center.	Diff. for 1 Hour of Long.	Sid. Time of Semi- Pass- ing Meri- dian.	Geocen- tric Semi-di- ameter.	Equa- torial Horiz- ontal Parallax.	Bright Limbs.
	h m	m	h m s	s	" "	" "	s	" "	" "	
L	9 5.61	1.840	2 11 5.73	120.54	+18 26 50.5	+649.4	64.39	14 46.6	54 8.1	II. N.
U	21 27.97	1.888	2 35 29.23	123.44	20 30 35.7	586.8	65.16	14 45.1	54 2.4	II. N.
U	9 50.92	1.939	3 0 28.79	126.52	22 21 4.4	516.6	65.96	14 44.0	53 58.6	II. N.
U	22 14.50	1.991	3 26 5.68	129.62	23 56 45.7	438.8	66.77	14 43.5	53 56.5	II. N.
L	10 38.69	2.040	3 52 19.04	132.56	+25 16 9.7	+353.8	67.52	14 43.4	53 56.1	II. S.
U	23 3.43	2.083	4 19 5.76	135.15	26 17 52.4	262.2	68.18	14 43.7	53 57.3	
L	11 28.63	2.117	4 46 20.51	137.21	27 0 40.6	165.0	68.70	14 44.4	54 0.0	
U	23 54.18	2.140	5 13 55.93	138.58	27 23 35.9	+ 63.8	69.05	14 45.5	54 4.2	
L	12 19.93	2.149	5 41 43.13	139.17	+27 26 0.1	- 39.8	69.20	14 47.0	54 9.7	
U	0 45.71	2.146	6 9 32.51	138.94	27 7 37.1	143.8	69.15	14 48.9	54 16.6	
L	13 11.37	2.129	6 37 14.48	137.95	26 28 35.2	246.1	68.92	14 51.2	54 24.8	I. S.
U	1 36.76	2.101	7 4 40.44	136.29	25 29 25.5	344.8	68.51	14 53.8	54 34.3	I. S.
L	14 1.77	2.066	7 31 43.45	134.14	+24 10 59.8	-438.5	67.97	14 56.7	54 45.2	I. N.
U	2 26.32	2.025	7 58 18.69	131.69	22 34 26.6	526.0	67.36	15 0.1	54 57.5	I. N.
L	14 50.37	1.983	8 24 23.72	129.14	20 41 6.3	666.2	66.71	15 3.8	55 11.1	I. N.
U	3 13.91	1.942	8 49 58.42	126.68	18 32 27.3	678.9	66.09	15 7.9	55 26.2	I. N.
L	15 36.98	1.905	9 15 4.91	124.46	+16 10 2.2	-743.8	65.52	15 12.4	55 42.7	I. N.
U	3 59.65	1.875	9 39 47.17	122.65	13 35 25.9	800.8	65.06	15 17.3	56 0.7	I. N.
L	16 22.01	1.854	10 4 10.67	121.38	10 50 14.2	849.8	64.74	15 22.6	56 20.1	I. N.
U	4 44.18	1.843	10 28 22.51	120.72	7 56 3.5	890.7	64.58	15 28.2	56 40.8	I. N.
L	17 6.28	1.844	10 52 30.67	120.77	+ 4 54 32.1	-923.1	64.61	15 34.2	57 2.9	I. N.
U	5 28.47	1.858	11 16 44.20	121.63	+ 1 47 22.3	946.9	64.86	15 40.6	57 26.1	I. N.
L	17 50.92	1.886	11 41 12.91	123.32	- 1 23 36.6	961.2	65.32	15 47.1	57 50.2	I. N.
U	6 13.79	1.929	12 6 7.34	125.91	4 36 25.0	965.0	66.03	15 53.9	58 14.9	I. N.
L	18 37.28	1.988	12 31 38.47	129.45	- 7 48 48.5	-956.8	66.97	16 0.7	58 39.9	I. N.
U	7 1.56	2.062	12 57 57.58	133.91	10 58 14.5	935.1	68.14	16 7.4	59 4.7	I. N.
L	19 26.82	2.151	13 25 15.77	139.27	14 1 47.3	897.7	69.52	16 14.0	59 28.8	I. N.
U	7 53.23	2.253	13 53 43.22	145.42	16 56 6.3	842.4	71.08	16 20.2	59 51.6	I. N.
L	20 20.94	2.365	14 23 28.21	152.14	-19 37 25.3	-767.3	72.73	16 25.9	60 12.5	I. N.
U	8 50.01	2.481	14 54 35.68	159.10	22 1 35.7	670.8	74.41	16 30.9	60 30.6	I. N.
L	21 20.45	2.592	15 27 5.57	165.79	24 4 17.3	552.5	75.99	16 34.9	60 45.5	I. N.
U	9 52.15	2.689	16 0 51.15	171.61	25 41 15.2	413.8	77.34	16 37.9	60 56.5	I. N. S.
L	22 24.87	2.760	16 35 38.04	175.91	-26 48 42.5	-258.3	78.32	16 39.6	61 3.0	I. N. S.
U	10 58.25	2.796	17 11 4.35	178.10	27 23 48.8	- 91.6	78.81	16 40.1	61 4.7	I. S.
L	23 31.83	2.793	17 46 42.78	177.88	27 25 5.0	+ 78.7	78.75	16 39.2	61 1.3	I. S.
U	12 5.12	2.749	18 22 3.97	175.25	26 52 38.2	244.3	78.14	16 36.9	60 52.9	I. II. S.
L	0 37.67	2.671	18 56 40.79	170.57	-25 48 9.6	+397.8	77.04	16 33.3	60 39.8	II. N. S.
U	13 9.13	2.568	19 30 11.63	164.36	24 14 40.2	533.7	75.58	16 28.6	60 22.4	II. N. S.
L	1 39.25	2.451	20 2 22.37	157.32	22 16 3.8	648.6	73.90	16 22.8	60 1.1	II. N. S.
U	14 7.94	2.330	20 33 6.42	150.02	19 56 40.6	741.5	72.12	16 16.2	59 36.7	II. N.
L	2 35.18	2.212	21 2 23.88	142.96	-17 20 51.4	+813.1	70.36	16 8.9	59 10.1	II. N.
U	15 1.07	2.104	21 30 19.59	136.45	14 32 42.1	805.2	68.71	16 1.2	58 41.8	II. N.
L	3 25.73	2.009	21 57 1.70	130.71	11 35 53.9	900.1	67.23	15 53.3	58 12.7	II. N.
U	15 49.34	1.928	22 22 40.16	125.85	8 33 39.4	920.0	65.96	15 45.3	57 43.4	II. N.
L	4 12.06	1.862	22 47 25.78	121.91	- 5 28 43.3	+927.4	64.91	15 37.5	57 14.7	II. N.

12 24, U Defective Illumination of S. 0".01.

12 26, U Defective Illumination of I. 0".00.

June 27, U Defective Illumination of N. 0".05.

FOR WASHINGTON MEAN AND APPARENT NOON.

Date.	Apparent Right Ascension.		Apparent Declination.		Hourly Motion.		Equation of Time for Apparent Noon.	Semi-diameter at Apparent Noon.	Sidereal Time of Semid. Passing Merid.	Sidereal Time of Mean Noon.
	Mean Noon.	App. Noon.	Mean Noon.	App. Noon.	Right Ascen.	Declination.				
	h m s	s	° ' "	"	s	"	m s	" "	m s	h m s
Jan. 1	18 44 28.76	29.40	-23 3 30.2	29.5	11.042	+11.71	+ 3 24.99	16 17.90	1 11.07	18 41 3.85
2	18 48 53.62	54.34	22 58 34.9	34.0	11.029	12.87	3 53.29	16 17.90	1 11.03	18 45 0.41
3	18 53 18.15	18.95	22 53 12.2	11.1	11.015	14.02	4 21.26	16 17.90	1 10.98	18 48 56.07
4	18 57 42.32	43.21	22 47 22.2	20.9	10.999	15.13	4 48.88	16 17.89	1 10.93	18 52 53.53
5	19 2 6.10	7.07	22 41 5.0	3.7	10.983	16.28	5 16.11	16 17.88	1 10.87	18 56 50.09
6	19 6 29.48	30.52	-22 34 20.8	19.3	10.965	+17.40	+ 5 42.94	16 17.86	1 10.81	19 0 46.65
7	19 10 52.43	53.54	22 27 9.8	7.9	10.947	18.51	6 9.33	16 17.83	1 10.75	19 4 43.21
8	19 15 14.92	16.11	22 19 32.3	30.1	10.927	19.62	6 35.25	16 17.80	1 10.68	19 8 39.77
9	19 19 36.92	38.19	22 11 28.3	25.9	10.905	20.71	7 0.71	16 17.76	1 10.61	19 12 36.32
10	19 23 58.40	59.75	22 2 58.2	55.4	10.884	21.80	7 25.64	16 17.72	1 10.54	19 16 32.88
11	19 28 19.35	20.77	-21 53 62.1	59.1	10.861	+22.87	+ 7 50.04	16 17.68	1 10.46	19 20 29.44
12	19 32 39.74	41.23	21 44 40.4	37.1	10.837	23.94	8 13.88	16 17.63	1 10.38	19 24 26.00
13	19 36 59.55	61.09	21 34 53.2	49.6	10.812	24.99	8 37.12	16 17.57	1 10.30	19 28 22.56
14	19 41 18.73	20.34	21 24 41.0	37.0	10.786	26.03	8 59.75	16 17.51	1 10.21	19 32 19.12
15	19 45 37.28	38.95	21 13 63.9	59.6	10.759	27.06	9 21.74	16 17.45	1 10.12	19 36 15.67
16	19 49 55.15	56.89	-21 2 62.4	57.8	10.731	+28.07	+ 9 43.06	16 17.37	1 10.03	19 40 12.33
17	19 54 12.34	14.14	20 51 36.7	31.8	10.702	29.07	10 3.69	16 17.30	1 9.93	19 44 8.79
18	19 58 28.82	30.67	20 39 47.2	42.0	10.672	30.05	10 23.61	16 17.23	1 9.83	19 48 5.35
19	20 2 44.57	46.47	20 27 34.2	28.7	10.641	31.02	10 42.80	16 17.16	1 9.73	19 52 1.61
20	20 6 59.57	61.52	20 14 58.2	52.3	10.609	31.98	11 1.24	16 17.08	1 9.63	19 55 58.46
21	20 11 13.81	15.80	-20 1 59.3	53.2	10.577	+32.92	+11 18.92	16 17.00	1 9.53	19 59 55.02
22	20 15 27.28	29.31	19 48 38.1	31.6	10.545	33.84	11 35.83	16 16.91	1 9.43	20 3 51.58
23	20 19 39.95	42.03	19 34 54.8	48.0	10.512	34.75	11 51.94	16 16.82	1 9.33	20 7 48.14
24	20 23 51.83	53.95	19 20 49.9	42.7	10.478	35.65	12 7.27	16 16.72	1 9.22	20 11 44.79
25	20 28 2.91	5.06	19 6 23.7	16.2	10.445	36.53	12 21.78	16 16.61	1 9.11	20 15 41.25
26	20 32 13.18	15.36	-18 51 36.6	28.7	10.411	+37.39	+12 35.47	16 16.50	1 9.00	20 19 37.81
27	20 36 22.63	24.84	18 36 28.8	20.7	10.377	38.24	12 48.38	16 16.38	1 8.89	20 23 34.37
28	20 40 31.26	33.50	18 20 61.0	52.5	10.343	39.07	13 0.45	16 16.26	1 8.78	20 27 30.92
29	20 44 39.07	41.34	18 5 13.4	4.6	10.308	39.89	13 11.69	16 16.14	1 8.66	20 31 27.48
30	20 48 46.06	48.35	17 48 66.4	57.4	10.274	40.69	13 22.12	16 16.01	1 8.54	20 35 24.04
Feb. 1	20 52 52.22	54.53	-17 32 40.4	31.0	10.240	+41.48	+13 31.72	16 15.87	1 8.42	20 39 20.39
2	20 56 57.57	59.00	17 15 55.6	46.0	10.206	42.25	13 40.50	16 15.73	1 8.30	20 43 17.15
3	21 1 2.11	4.45	16 58 52.6	42.7	10.172	43.00	13 48.48	16 15.58	1 8.19	20 47 13.79
4	21 5 5.84	8.19	16 41 31.7	21.5	10.139	43.74	13 55.64	16 15.43	1 8.07	20 51 10.26
5	21 9 8.76	11.13	16 23 53.3	42.9	10.105	44.46	14 2.00	16 15.27	1 7.96	20 55 6.82
6	21 13 10.88	13.26	-16 5 57.8	47.2	10.072	+45.16	+14 7.56	16 15.10	1 7.84	20 59 3.38
7	21 17 12.21	14.59	15 47 45.5	34.6	10.039	45.85	14 12.33	16 14.93	1 7.72	21 2 59.93
8	21 21 12.76	15.14	15 29 16.8	5.7	10.006	46.53	14 16.30	16 14.76	1 7.61	21 6 56.49
9	21 25 12.51	14.90	15 10 32.3	21.0	9.974	47.18	14 19.50	16 14.58	1 7.50	21 10 53.04
10	21 29 11.49	13.87	14 51 32.2	20.8	9.941	47.82	14 21.91	16 14.40	1 7.39	21 14 49.60
11	21 33 9.70	12.07	-14 32 17.0	5.5	9.909	+48.44	+14 23.55	16 14.22	1 7.28	21 18 46.16
12	21 37 7.13	9.50	14 12 47.2	35.5	9.877	49.04	14 24.43	16 14.03	1 7.17	21 22 42.71
13	21 41 3.80	6.17	13 52 63.2	51.3	9.845	49.63	14 24.53	16 13.84	1 7.06	21 26 39.27
14	21 44 59.71	62.07	13 32 65.3	53.3	9.814	50.19	14 23.88	16 13.65	1 6.95	21 30 35.82
15	21 48 54.87	57.21	13 12 54.2	42.0	9.783	50.73	14 22.48	16 13.46	1 6.84	21 34 32.38
16	21 52 49.28	51.61	-12 52 30.2	17.9	9.752	+51.26	+14 20.32	16 13.27	1 6.74	21 38 28.03
17	21 56 42.95	45.27	12 31 53.7	41.4	9.721	+51.77	+14 17.43	16 13.08	1 6.63	21 42 25.49

NOTE.—For mean time interval of semidiameter passing meridian, subtract 0.19 from the sidereal interval.

(Eph 15)

FOR WASHINGTON MEAN AND APPARENT NOON.

ate.	Apparent Right Ascension.			Apparent Declination.			Hourly Motion.		Equation of Time for Apparent Noon.	Semi-diameter at Apparent Noon.	Sidereal Time of Semid. Passing Merid.	Sidereal Time of Mean Noon.
	Mean Noon.	App. Noon.		Mean Noon.	App. Noon.	Right Ascen.	Declination.					
	h m s			" ' "	" "	s	"	m s	" "	m s	m s	h m s
b. 16	21 56 42.95	45.27	-12 31 53.7	41.4	9.721	+51.77	+14 17.43	16 13.08	1 6.63	21 42 25.49		
17	22 0 35.89	38.19	12 10 65.3	52.9	9.691	52.26	14 13.81	16 12.88	1 6.53	21 46 22.04		
18	22 4 28.11	30.39	11 49 65.2	52.8	9.661	52.74	14 9.47	16 12.67	1 6.43	21 50 18.60		
19	22 8 19.62	21.88	11 28 54.1	41.6	9.632	53.19	14 4.42	16 12.46	1 6.33	21 54 15.15		
20	22 12 10.44	12.67	11 7 32.2	19.7	9.603	53.63	13 58.67	16 12.25	1 6.23	21 58 11.71		
21	22 16 0.57	2.78	-10 45 60.1	47.6	9.575	+54.05	+13 52.24	16 12.04	1 6.13	22 2 8.26		
22	22 19 50.03	52.22	10 24 18.1	5.6	9.547	54.45	13 45.14	16 11.83	1 6.04	22 6 4.82		
23	22 23 38.84	41.00	10 2 26.6	14.2	9.520	54.84	13 37.39	16 11.61	1 5.95	22 10 1.37		
24	22 27 27.01	29.15	9 40 26.1	13.7	9.494	55.21	13 29.01	16 11.39	1 5.86	22 13 57.93		
25	22 31 14.56	16.67	9 18 17.0	4.6	9.469	55.56	13 20.00	16 11.16	1 5.77	22 17 54.48		
26	22 35 1.51	3.58	-8 55 59.6	47.3	9.444	+55.89	+13 10.39	16 10.94	1 5.69	22 21 51.04		
27	22 38 47.88	49.92	8 33 34.3	22.1	9.420	56.21	13 0.20	16 10.71	1 5.61	22 25 47.59		
28	22 42 33.68	35.69	8 10 61.5	49.4	9.397	56.52	12 49.44	16 10.48	1 5.53	22 29 44.14		
17. 1	22 46 18.94	20.92	7 48 21.5	9.6	9.375	56.81	12 38.14	16 10.24	1 5.46	22 33 40.70		
2	22 50 3.68	5.62	7 25 34.8	23.0	9.354	57.08	12 26.33	16 10.00	1 5.39	22 37 37.25		
3	22 53 47.93	49.83	-7 2 41.8	30.0	9.334	+57.34	+12 14.01	16 9.75	1 5.32	22 41 33.81		
4	22 57 31.70	33.56	6 39 42.7	31.1	9.314	57.58	12 1.22	16 9.50	1 5.25	22 45 30.36		
5	23 1 15.02	16.84	6 16 37.9	26.5	9.295	57.81	11 47.99	16 9.25	1 5.18	22 49 26.92		
6	23 4 57.90	59.69	5 53 27.8	16.6	9.278	58.02	11 34.32	16 8.99	1 5.12	22 53 23.47		
7	23 8 40.38	42.12	5 30 12.7	1.7	9.262	58.23	11 20.24	16 8.73	1 5.06	22 57 20.02		
8	23 12 22.47	24.17	-5 6 53.0	42.3	9.246	+58.41	+11 5.78	16 8.47	1 5.00	23 1 16.58		
9	23 16 4.19	5.86	4 43 29.3	18.7	9.231	58.57	10 50.95	16 8.21	1 4.94	23 5 13.13		
10	23 19 45.56	47.19	4 19 61.7	51.4	9.217	58.72	10 35.77	16 7.95	1 4.88	23 9 9.63		
11	23 23 26.60	28.19	3 56 30.7	20.6	9.203	58.86	10 20.25	16 7.68	1 4.83	23 13 6.24		
12	23 27 7.32	8.87	3 32 56.8	46.8	9.190	58.97	10 4.42	16 7.41	1 4.78	23 17 2.79		
13	23 30 47.75	49.25	-3 9 20.2	10.5	9.178	+59.07	+ 9 48.30	16 7.13	1 4.73	23 20 59.34		
14	23 34 27.90	29.36	2 45 41.4	32.0	9.167	59.16	9 31.90	16 6.87	1 4.69	23 24 55.90		
15	23 38 7.79	9.20	2 21 60.9	51.8	9.157	59.22	9 15.23	16 6.60	1 4.65	23 28 52.45		
16	23 41 47.43	48.80	1 58 19.1	10.2	9.147	59.27	8 58.32	16 6.34	1 4.62	23 32 49.01		
17	23 45 26.84	28.17	1 34 36.2	27.6	9.138	59.30	8 41.18	16 6.07	1 4.59	23 36 45.56		
18	23 49 6.04	7.32	-1 10 52.7	44.4	9.129	+59.32	+ 8 23.83	16 5.80	1 4.56	23 40 42.11		
19	23 52 45.04	46.28	0 47 9.1	1.1	9.121	59.32	8 6.28	16 5.54	1 4.54	23 44 38.67		
20	23 56 23.88	25.06	0 23 25.6	17.9	9.114	59.30	7 48.56	16 5.27	1 4.52	23 48 35.22		
21	0 0 2.55	3.69	+ 0 0 17.3	24.7	9.108	59.27	7 30.69	16 5.00	1 4.50	23 52 31.77		
22	0 3 41.09	42.18	0 23 59.2	66.4	9.103	59.22	7 12.67	16 4.73	1 4.48	23 56 28.33		
23	0 7 19.51	20.56	+ 0 47 39.9	46.8	9.099	+59.16	+ 6 54.54	16 4.46	1 4.47	0 0 24.88		
24	0 10 57.83	58.83	1 11 18.9	25.5	9.095	59.09	6 36.31	16 4.19	1 4.46	0 4 21.44		
25	0 14 36.07	37.02	1 34 56.0	62.2	9.092	59.00	6 18.00	16 3.92	1 4.45	0 8 17.99		
26	0 18 14.25	15.15	1 58 30.7	36.6	9.090	58.89	5 59.63	16 3.65	1 4.44	0 12 14.54		
27	0 21 52.40	53.25	2 22 2.6	8.2	9.089	58.77	5 41.23	16 3.37	1 4.44	0 16 11.10		
28	0 25 30.53	31.34	+ 2 45 31.5	36.8	9.089	+58.64	+ 5 22.80	16 3.10	1 4.44	0 20 7.65		
29	0 29 8.66	9.43	3 8 57.0	62.0	9.090	58.49	5 4.39	16 2.83	1 4.44	0 24 4.70		
30	0 32 46.83	47.55	3 32 18.9	23.5	9.091	58.33	4 46.01	16 2.55	1 4.45	0 28 0.26		
31	0 36 25.05	25.73	3 55 36.7	41.0	9.094	58.16	4 27.69	16 2.27	1 4.46	0 31 57.31		
17. 1	0 40 3.35	3.98	4 18 50.2	54.2	9.098	57.97	4 9.43	16 1.99	1 4.47	0 35 53.86		
2	0 43 41.76	42.34	+ 4 41 59.1	62.8	9.103	+57.77	+ 3 51.29	16 1.71	1 4.49	0 39 50.42		
3	0 47 20.29	20.82	+ 5 5 3.1	6.5	9.108	+57.56	+ 3 33.27	16 1.43	1 4.51	0 43 46.97		

NOTE.—For mean time interval of semidiameter passing meridian, subtract 0.18 from the sidereal interval.

[Eph 15]

FOR WASHINGTON MEAN AND APPARENT NOON.

Date.	Apparent Right Ascension.			Apparent Declination.			Hourly Motion.		Equation of Time for Apparent Noon.	Semi-diameter at Apparent Noon.	Sidereal Time of Semid. Passing Merid.	M
	Mean Noon.	App. Noon.	Mean Noon.	App. Noon.	Right Ascen.	Declination.	Right Ascen.	Declination.				
	h m s	s	" ' "	" ' "	s	"	m s	"	m s	"	m s	h
Apr. 1	0 40 3.35	3.98	+ 4 18 50.2	54.2	9.098	+57.97	+4 9.43	16 1.99	1 4.47	c		
2	0 43 41.76	42.34	4 41 59.1	62.8	9.103	57.77	3 51.29	16 1.71	1 4.49	c		
3	0 47 20.29	20.82	5 5 3.1	6.5	9.108	57.56	3 33.27	16 1.43	1 4.51	c		
4	0 50 58.97	59.46	5 28 1.7	4.9	9.114	57.33	3 15.40	16 1.15	1 4.53	c		
5	0 54 37.81	38.26	5 50 54.8	57.6	9.122	57.09	2 57.69	16 0.87	1 4.55	c		
6	0 58 16.85	17.25	+ 6 13 41.9	44.4	9.131	+56.83	+ 2 40.19	16 0.59	1 4.58	c		
7	1 1 56.10	56.46	6 36 22.7	24.9	9.140	56.56	2 22.88	16 0.30	1 4.61	c		
8	1 5 35.57	35.89	6 58 56.9	58.8	9.150	56.28	2 5.80	16 0.02	1 4.64	i		
9	1 9 15.28	15.56	7 21 24.0	25.7	9.160	55.98	1 48.96	15 59.74	1 4.68	i		
10	1 12 55.26	55.49	7 43 43.8	45.2	9.171	55.66	1 32.39	15 59.46	1 4.72	i		
11	1 16 35.50	35.70	+ 8 5 55.9	57.0	9.183	+55.33	+1 16.09	15 59.18	1 4.76	i		
12	1 20 16.04	16.19	8 27 59.8	60.7	9.195	54.99	1 0.07	15 58.91	1 4.80	i		
13	1 23 56.88	56.99	8 49 55.3	56.0	9.208	54.63	0 44.36	15 58.64	1 4.84	i		
14	1 27 38.03	38.11	9 11 42.0	42.4	9.222	54.25	0 28.96	15 58.37	1 4.89	i		
15	1 31 19.51	19.55	9 33 19.4	19.6	9.236	53.86	+0 13.89	15 58.10	1 4.94	i		
16	1 35 1.33	1.33	+ 9 54 47.3	47.3	9.250	+53.46	-0 0.84	15 57.83	1 4.99	i		
17	1 38 43.51	43.47	10 16 5.2	5.1	9.265	53.04	0 15.22	15 57.56	1 5.04	i		
18	1 42 26.05	25.97	10 37 13.0	12.7	9.280	52.61	0 29.23	15 57.30	1 5.10	i		
19	1 46 8.96	8.85	10 58 10.2	9.7	9.296	52.16	0 42.87	15 57.04	1 5.16	i		
20	1 49 52.26	52.12	11 18 56.5	55.7	9.312	51.70	0 56.12	15 56.79	1 5.22	i		
21	1 53 35.96	35.79	+11 39 31.5	30.5	9.329	+51.22	-1 8.98	15 56.54	1 5.28	i		
22	1 57 20.08	19.87	11 59 54.9	53.7	9.347	50.73	1 21.41	15 56.29	1 5.34	i		
23	2 1 4.62	4.38	12 20 6.3	5.0	9.365	50.23	1 33.42	15 56.04	1 5.40	i		
24	2 4 49.60	49.33	12 40 5.5	4.0	9.383	49.71	1 45.00	15 55.79	1 5.47	2		
25	2 8 35.02	34.72	12 59 52.1	50.5	9.402	49.18	1 56.13	15 55.54	1 5.54	2		
26	2 12 20.91	20.58	+13 19 25.9	24.2	9.422	+48.64	-2 6.80	15 55.29	1 5.61	2		
27	2 16 7.27	6.91	13 38 46.6	44.7	9.442	48.08	2 16.99	15 55.04	1 5.68	2		
28	2 19 54.12	53.73	13 57 53.7	51.7	9.462	47.51	2 26.70	15 54.80	1 5.75	2		
29	2 23 41.47	41.06	14 16 47.1	45.0	9.483	46.93	2 35.90	15 54.55	1 5.83	2		
30	2 27 29.34	28.90	14 35 26.4	24.3	9.505	46.34	2 44.59	15 54.31	1 5.91	2		
May 1	2 31 17.73	17.27	+14 53 51.4	49.2	9.528	+45.74	-2 52.75	15 54.07	1 5.99	2		
2	2 35 6.67	6.19	15 11 61.7	59.4	9.551	45.12	3 0.37	15 53.82	1 6.07	2		
3	2 38 56.17	55.67	15 29 57.1	54.7	9.574	44.49	3 7.43	15 53.58	1 6.15	2		
4	2 42 46.22	45.71	15 47 37.3	34.8	9.597	43.85	3 13.93	15 53.34	1 6.23	2		
5	2 46 36.85	36.32	16 4 46.1	59.4	9.621	43.20	3 19.86	15 53.10	1 6.31	2		
6	2 50 28.06	27.51	+16 22 10.5	8.1	9.646	+42.53	-3 25.21	15 52.86	1 6.39	2		
7	2 54 19.85	19.28	16 39 3.0	0.6	9.670	41.85	3 29.98	15 52.63	1 6.47	2		
8	2 58 12.22	11.64	16 55 38.9	36.5	9.694	41.15	3 34.16	15 52.41	1 6.55	3		
9	3 2 5.18	4.59	17 11 58.0	55.6	9.719	40.44	3 37.76	15 52.19	1 6.63	3		
10	3 5 58.72	58.13	17 27 60.0	57.5	9.743	39.72	3 40.77	15 51.97	1 6.72	3		
11	3 9 52.85	52.25	+17 43 44.4	42.0	9.768	+38.99	-3 43.20	15 51.75	1 6.80	3		
12	3 13 47.57	46.95	17 59 11.1	8.7	9.792	38.24	3 45.05	15 51.54	1 6.88	3		
13	3 17 42.86	42.24	18 14 19.6	17.3	9.816	37.48	3 46.31	15 51.33	1 6.96	3		
14	3 21 38.73	38.10	18 29 9.8	7.5	9.840	36.70	3 47.01	15 51.12	1 7.04	3		
15	3 25 35.16	34.54	18 43 41.1	38.9	9.863	35.91	3 47.12	15 50.91	1 7.12	3		
16	3 29 32.17	31.54	+18 57 53.6	51.4	9.887	+35.12	-3 46.67	15 50.71	1 7.20	3		
17	3 33 29.73	29.11	+19 11 46.7	44.6	9.910	+34.31	-3 45.66	15 50.52	1 7.29	3		

NOTE.—For mean time interval of semidiameter passing meridian, subtract 0.18 from the sidereal interval (Eph 15)

ANSIT OF MOON'S CENTER OVER THE MERIDIAN OF WASHINGTON.

Mean Time of Transit.	Diff. for 1 Hour of Long.	Right Ascension of Center.	Diff. for 1 Hour of Long.	Geocentric Declination of Center.	Diff. for 1 Hour of Long.	Sid. Time of Semid. Passing Meridian.	Geocentric Semidiameter.	Equatorial Horizontal Parallax.	Bright Limbs.
h m	m	h m s	s	° ' "	"	s	" "	" "	
10 56.84	1.917	10 1 24.61	125.20	+11 0 51.2	-873.6	65.56	15 32.9	56 57.9	II. S.
23 19.77	1.906	10 26 22.36	124.53	8 1 33.7	917.6	65.36	15 38.4	57 18.1	
11 42.62	1.904	10 51 15.34	124.42	4 54 31.9	950.9	65.33	15 43.7	57 37.7	
0 5.51	1.913	11 16 10.96	124.97	+ 1 41 57.9	972.8	65.48	15 48.8	57 56.2	
12 28.58	1.934	11 41 17.23	126.21	- 1 33 47.6	-982.6	65.81	15 53.4	58 13.3	
0 51.97	1.966	12 6 42.67	128.16	4 50 13.8	979.5	66.35	15 57.7	58 28.8	
13 15.82	2.011	12 32 36.01	130.85	8 4 39.8	962.5	67.09	16 1.4	58 42.5	I. N.
1 40.28	2.068	12 59 5.91	134.24	11 14 14.4	930.7	68.01	16 4.6	58 54.2	I. N.
14 5.48	2.135	13 26 20.51	138.29	-14 15 55.1	-883.3	69.09	16 7.2	59 3.9	I. N.
2 31.55	2.210	13 54 26.91	142.86	17 6 30.8	819.8	70.30	16 9.3	59 11.5	I. N.
14 58.56	2.292	14 23 30.41	147.77	19 42 43.3	739.5	71.57	16 10.8	59 17.0	I. N.
3 26.57	2.375	14 53 33.62	152.75	22 1 12.3	642.6	72.85	16 11.8	59 20.6	I. N.
15 55.55	2.454	15 24 35.53	157.48	-23 58 42.4	-529.9	74.05	16 12.3	59 22.4	I. N.
4 25.42	2.522	15 56 30.70	161.56	25 32 13.2	403.1	75.06	16 12.3	59 22.4	I. N.
16 56.00	2.572	16 29 8.85	164.59	26 39 11.6	265.0	75.81	16 11.9	59 20.9	I. N.
5 27.05	2.599	17 2 15.33	166.23	27 17 44.6	-119.6	76.21	16 11.0	59 17.9	I. N.
17 58.27	2.600	17 35 32.02	166.28	-27 26 50.8	+ 28.7	76.23	16 9.9	59 13.6	I. N.S.
6 29.34	2.574	18 8 39.52	164.71	27 6 26.3	174.7	75.84	16 8.3	59 8.0	I. N.S.
18 59.94	2.524	18 41 19.22	161.69	26 17 26.1	313.9	75.09	16 6.5	59 1.3	I. S.
7 29.83	2.454	19 13 15.40	157.52	25 1 36.5	442.4	74.06	16 4.4	58 53.6	I. S.
19 58.80	2.372	19 44 16.56	152.59	-23 21 24.5	+557.2	72.82	16 2.0	58 44.7	I. S.
8 26.74	2.284	20 14 16.00	147.29	21 19 43.4	656.9	71.46	15 59.3	58 34.7	I. S.
20 53.62	2.196	20 43 11.54	141.98	18 59 40.8	740.8	70.08	15 56.3	58 23.7	I. S.
9 19.47	2.112	21 11 4.83	136.95	16 24 27.4	808.8	68.75	15 53.0	58 11.6	I. S.
21 44.35	2.037	21 38 0.35	132.40	-13 37 10.5	+861.5	67.52	15 49.4	57 58.5	I. S.
10 81.79	1.971	22 4 4.61	128.43	10 40 48.3	899.8	66.44	15 45.6	57 44.4	I. S.
22 31.70	1.916	22 29 25.32	125.14	7 38 8.3	924.6	65.53	15 41.5	57 29.4	I. S.
10 54.42	1.874	22 54 10.85	122.57	4 31 46.3	936.9	64.81	15 37.2	57 13.7	I. S.
23 16.70	1.842	23 18 29.75	120.71	- 1 24 7.2	+937.6	64.28	15 32.7	56 57.2	I. N.S.
11 38.68	1.823	23 42 30.51	119.54	+ 1 42 34.7	927.5	63.96	15 28.1	56 40.3	I. N.S.
0 0.50	1.815	0 6 21.30	119.05	4 46 14.1	907.3	63.82	15 23.4	56 23.1	I. II. N.
12 22.28	1.817	0 30 9.89	119.17	7 44 54.2	877.7	63.86	15 18.7	56 5.9	II. N.
0 44.14	1.828	0 54 3.49	119.87	+10 36 44.3	+839.1	64.06	15 14.1	55 48.9	II. N.
13 6.20	1.848	1 18 8.60	121.08	13 20 0.1	792.1	64.42	15 9.6	55 32.4	II. N.
1 28.54	1.876	1 42 30.89	122.72	15 53 1.9	736.9	64.89	15 5.3	55 16.8	II. N.
13 51.24	1.909	2 7 15.07	124.70	18 14 14.7	674.0	65.46	15 1.4	55 2.2	II. N.
2 14.36	1.946	2 32 24.60	126.91	+20 22 7.8	+603.7	66.09	14 57.7	54 48.9	II. N.
14 37.94	1.984	2 58 1.58	129.24	22 15 15.4	526.4	66.75	14 54.6	54 37.3	II. N.
3 1.99	2.023	3 24 6.51	131.55	23 52 17.8	442.9	67.40	14 51.9	54 27.6	II. N.
15 26.48	2.058	3 50 38.20	133.69	25 12 2.0	353.6	68.00	14 49.9	54 20.0	II. N.
3 51.36	2.088	4 17 33.68	135.50	+26 13 25.1	+259.5	68.51	14 48.4	54 14.7	II. N.
16 16.57	2.111	4 44 48.41	136.87	26 55 35.3	161.7	68.90	14 47.6	54 11.8	II. N.
4 42.00	2.125	5 12 16.45	137.71	27 17 54.6	+ 61.3	69.14	14 47.6	54 11.6	II. N.
17 7.53	2.129	5 39 50.94	137.95	27 20 0.6	- 40.3	69.22	14 48.3	54 14.2	II. N.S.
5 33.05	2.123	6 7 24.68	137.58	+27 1 47.3	-141.8	69.13	14 49.7	54 19.5	II. N.S.

U Defective Illumination of N. 0".34.
U Defective Illumination of S. 0".22.

Sept. 29. U Defective Illumination of S. 0".95.

[Rph 13]

FOR WASHINGTON MEAN AND APPARENT NOON.

Date.	Apparent Right Ascension.			Apparent Declination.			Hourly Motion.		Equation of Time for Apparent Noon.	Semi-diameter at Apparent Noon.	Sidereal Time of Semid. Passing Merid.	Sidereal Time of Mean Noon.
	Mean Noon.	App. Noon.		Mean Noon.	App. Noon.	Right Ascen.	Declination.					
	h m s	s	" ' "	"	s	"	"	m s	"	m s	m s	h m s
July 1	6 38 9.38	9.98	+23 9 44.2	43.6	10.344	-9.43	+3 28.89	15 45.69	1 8.77	6 34 40.51		
2	6 42 17.53	18.16	23 5 45.8	45.2	10.335	10.44	3 40.49	15 45.67	1 8.74	6 38 37.07		
3	6 46 25.43	26.10	23 1 23.3	22.5	10.324	11.45	3 51.84	15 45.66	1 8.70	6 42 33.63		
4	6 50 33.08	33.78	22 56 36.6	35.7	10.313	12.45	4 2.93	15 45.65	1 8.66	6 46 30.19		
5	6 54 40.44	41.17	22 51 25.8	24.8	10.301	13.45	4 13.73	15 45.64	1 8.62	6 50 26.74		
6	6 58 47.50	48.25	+22 45 51.1	50.1	10.287	-14.44	+ 4 24.22	15 45.64	1 8.57	6 54 23.30		
7	7 2 54.22	55.00	22 39 52.7	51.6	10.273	15.43	4 34.39	15 45.65	1 8.52	6 58 19.86		
8	7 7 0.59	1.40	22 33 30.6	29.4	10.258	16.41	4 44.21	15 45.66	1 8.47	7 2 16.42		
9	7 11 6.61	7.44	22 26 45.0	43.7	10.242	17.38	4 53.66	15 45.68	1 8.41	7 6 12.98		
10	7 15 12.23	13.09	22 19 36.2	34.7	10.226	18.35	5 2.72	15 45.70	1 8.35	7 10 9.54		
11	7 19 17.44	18.32	+22 12 4.2	2.5	10.208	-19.31	+5 11.37	15 45.73	1 8.29	7 14 6.09		
12	7 23 22.22	23.12	22 4 9.2	7.4	10.190	20.27	5 19.59	15 45.76	1 8.23	7 18 2.65		
13	7 27 26.55	27.47	21 55 51.4	49.5	10.171	21.22	5 27.36	15 45.80	1 8.17	7 21 59.21		
14	7 31 30.40	31.35	21 47 11.1	9.0	10.151	22.15	5 34.66	15 45.85	1 8.10	7 25 55.77		
15	7 35 33.78	34.74	21 38 8.4	6.2	10.130	23.07	5 41.48	15 45.90	1 8.03	7 29 52.33		
16	7 39 36.64	37.62	+21 28 43.6	41.3	10.109	-23.99	+5 47.79	15 45.95	1 7.96	7 33 48.88		
17	7 43 38.99	39.98	21 18 57.0	54.5	10.087	24.90	5 53.57	15 46.01	1 7.89	7 37 45.44		
18	7 47 40.80	41.80	21 8 48.7	46.1	10.065	25.79	5 58.82	15 46.08	1 7.82	7 41 42.00		
19	7 51 42.06	43.07	20 58 19.0	16.2	10.041	26.68	6 3.52	15 46.15	1 7.75	7 45 38.56		
20	7 55 42.75	43.78	20 47 28.0	25.2	10.017	27.56	6 7.66	15 46.23	1 7.67	7 49 35.11		
21	7 59 42.88	43.92	+20 36 16.2	13.3	9.993	-28.43	+6 11.23	15 46.31	1 7.59	7 53 31.67		
22	8 3 42.44	43.48	20 24 43.7	40.7	9.969	29.28	6 14.23	15 46.39	1 7.51	7 57 28.23		
23	8 7 41.41	42.45	20 12 50.7	47.6	9.945	30.13	6 16.64	15 46.48	1 7.43	8 1 24.78		
24	8 11 39.79	40.83	20 0 37.5	34.3	9.920	30.97	6 18.46	15 46.57	1 7.35	8 5 21.34		
25	8 15 37.58	38.63	19 48 4.3	1.0	9.896	31.79	6 19.69	15 46.66	1 7.26	8 9 17.90		
26	8 19 34.79	35.84	+19 35 11.5	8.0	9.871	-32.61	+6 20.33	15 46.75	1 7.18	8 13 14.46		
27	8 23 31.40	32.45	19 21 59.1	55.6	9.847	33.42	6 20.38	15 46.85	1 7.09	8 17 11.01		
28	8 27 27.42	28.46	19 8 27.5	23.9	9.822	34.21	6 19.84	15 46.95	1 7.01	8 21 7.57		
29	8 31 22.85	23.88	18 54 36.9	33.2	9.797	35.00	6 18.72	15 47.05	1 6.92	8 25 4.13		
30	8 35 17.70	18.72	18 40 27.5	23.8	9.773	35.78	6 17.00	15 47.16	1 6.83	8 29 0.68		
31	8 39 11.95	12.96	+18 25 59.6	55.9	9.748	-36.54	+6 14.70	15 47.27	1 6.74	8 32 57.24		
Aug. 1	8 43 5.62	6.62	18 11 13.5	9.7	9.724	37.30	6 11.81	15 47.39	1 6.66	8 36 53.80		
2	8 46 58.70	59.69	17 56 9.5	5.6	9.699	38.04	6 8.33	15 47.51	1 6.57	8 40 50.35		
3	8 50 51.19	52.17	17 40 47.9	43.9	9.675	38.77	6 4.26	15 47.63	1 6.49	8 44 46.91		
4	8 54 43.10	44.06	17 25 8.8	4.9	9.651	39.48	5 59.61	15 47.75	1 6.40	8 48 43.47		
5	8 58 34.41	35.36	+17 9 12.8	8.8	9.626	-40.19	+5 54.37	15 47.88	1 6.31	8 52 40.03		
6	9 2 25.14	26.07	16 52 59.9	55.9	9.602	40.88	5 48.54	15 48.02	1 6.22	8 56 36.58		
7	9 6 15.29	16.20	16 36 30.6	26.6	9.577	41.56	5 42.13	15 48.16	1 6.13	9 0 33.14		
8	9 10 4.86	5.74	16 19 45.0	41.1	9.553	42.23	5 35.14	15 48.30	1 6.05	9 4 29.69		
9	9 13 53.84	54.71	16 2 43.7	39.8	9.529	42.88	5 27.57	15 48.45	1 5.96	9 8 26.25		
10	9 17 42.25	43.09	+15 45 26.8	23.0	9.505	-43.52	+5 19.41	15 48.60	1 5.88	9 12 22.80		
11	9 21 30.08	30.89	15 27 54.8	51.0	9.481	44.15	5 10.69	15 48.75	1 5.79	9 16 19.36		
12	9 25 17.33	18.13	15 10 7.9	4.2	9.457	44.76	5 1.39	15 48.92	1 5.71	9 20 15.92		
13	9 29 4.02	4.79	14 52 6.4	2.8	9.434	45.36	4 51.52	15 49.09	1 5.63	9 24 12.47		
14	9 32 50.15	50.89	14 33 50.9	47.3	9.410	45.94	4 41.09	15 49.27	1 5.55	9 28 9.03		
15	9 36 35.71	36.42	+14 15 21.4	17.9	9.387	-46.51	+4 30.10	15 49.45	1 5.47	9 32 5.58		
16	9 40 20.72	21.40	+13 56 38.5	35.0	9.364	-47.07	+4 18.55	15 49.63	1 5.40	9 36 2.14		

NOTE.—For mean time interval of semidiameter passing meridian, subtract 0°.19 from the sidereal interval.
[Eph 15]

ANSIT OF MOON'S CENTER OVER THE MERIDIAN OF WASHINGTON.

Mean Time of Transit.	Diff. for 1 Hour of Long.	Right Ascension of Center.	Diff. for 1 Hour of Long.	Geocentric Declination of Center.	Diff. for 1 Hour of Long.	Sid. Time of Semi- d. Pass- ing Me- ridian.	Geo- centric Semi-di- ameter.	Equa- torial Horiz- ontal Parallax.	Bright Limbs.
h m	m	h m s	s	° ' "	"	s	"	"	
12 31.90	1.956	2 38 5.16	127.56	+20 41 33.9	+581.3	66.07	14 55.4	54 40.4	II. N.
0 55.62	1.997	3 3 50.65	130.02	22 30 9.5	503.4	66.74	14 52.7	54 30.5	II. N.
13 19.82	2.035	3 30 5.02	132.34	24 2 28.6	418.8	67.39	14 50.4	54 21.9	II. N.
1 44.46	2.070	3 56 45.69	134.37	25 17 16.0	328.3	67.95	14 48.4	54 14.8	II. N.
14 9.46	2.096	4 23 48.31	135.97	+26 13 28.1	+233.1	68.40	14 46.9	54 9.3	II. N.
2 34.73	2.113	4 51 6.92	137.01	26 50 17.1	134.7	68.72	14 46.0	54 5.7	II. N.
15 0.15	2.120	5 18 34.33	137.43	27 7 12.4	+34.5	68.86	14 45.5	54 4.1	II. N.
3 25.58	2.117	5 46 2.82	137.21	27 4 1.9	-66.0	68.84	14 45.7	54 4.7	II. N.
15 50.91	2.102	6 13 24.67	136.34	+26 40 52.2	-165.2	68.65	14 46.5	54 7.7	II. N. S.
4 16.00	2.079	6 40 32.87	134.94	25 58 7.6	261.7	68.32	14 48.0	54 13.1	II. N. S.
16 40.78	2.049	7 7 21.76	133.14	24 56 27.2	354.3	67.87	14 50.2	54 21.1	II. S.
5 5.17	2.015	7 33 47.34	131.09	23 36 42.4	442.3	67.35	14 53.1	54 31.8	II. S.
17 29.13	1.979	7 59 47.46	128.94	+21 59 53.1	-525.0	66.78	14 56.7	54 45.2	II. S.
5 52.67	1.945	8 25 22.01	126.86	20 7 6.0	601.9	66.23	15 1.1	55 1.2	II. S.
18 15.81	1.913	8 50 32.62	124.98	17 59 31.5	672.8	65.72	15 6.2	55 19.8	II. S.
6 38.61	1.888	9 15 22.65	123.44	15 38 23.1	737.5	65.29	15 11.9	55 40.8	II. S.
19 1.15	1.870	9 39 56.87	122.36	+13 4 56.7	-795.8	64.98	15 18.2	56 4.1	II. S.
7 23.53	1.861	10 4 21.36	121.83	10 20 32.0	847.2	64.81	15 25.1	56 29.5	II. S.
19 45.86	1.863	10 28 43.23	121.94	7 26 33.9	891.3	64.82	15 32.5	56 56.5	II. S.
8 8.28	1.876	10 53 10.51	122.75	4 24 34.7	927.2	65.01	15 40.2	57 24.7	II. S.
20 30.94	1.902	11 17 52.05	124.32	+1 16 18.2	-953.9	65.40	15 48.0	57 53.7	II. S.
8 54.00	1.942	11 42 57.32	126.70	-1 56 17.3	970.2	66.01	15 56.0	58 22.8	II. S.
21 17.61	1.996	12 8 36.29	129.93	5 10 55.8	974.2	66.85	16 3.8	58 51.4	II. S.
9 41.95	2.064	12 34 59.18	134.02	8 24 58.8	963.9	67.90	16 11.3	59 18.8	II. S.
22 7.19	2.145	13 2 15.99	138.92	-11 35 23.5	-937.3	69.14	16 18.2	59 44.2	II. S.
10 33.48	2.238	13 30 36.01	144.53	14 38 40.7	892.3	70.55	16 24.4	60 6.9	II. S.
23 0.95	2.341	14 0 6.81	150.67	17 30 57.0	826.9	72.08	16 29.6	60 26.1	
11 29.67	2.447	14 30 53.07	157.04	20 7 59.1	739.8	73.64	16 33.8	60 41.3	
23 59.65	2.549	15 2 55.21	163.23	-22 25 24.4	-630.8	75.14	16 36.7	60 52.0	
12 30.81	2.640	15 36 7.87	168.70	24 18 57.1	501.4	76.45	16 38.3	60 57.8	
1 2.93	2.710	16 10 19.00	172.89	25 44 48.9	354.8	77.45	16 38.5	60 58.7	I. N.
13 35.72	2.749	16 45 9.93	175.27	26 40 3.7	196.2	78.03	16 37.4	60 54.8	I. N.
2 8.77	2.753	17 20 16.76	175.50	-27 2 57.3	-32.5	78.13	16 35.1	60 46.3	I. N.
14 41.65	2.721	17 55 13.14	173.53	26 53 12.6	+128.9	77.70	16 31.7	60 33.7	I. N.
3 13.94	2.655	18 29 33.82	169.61	26 11 57.8	281.4	76.81	16 27.3	60 17.5	I. N.
15 45.28	2.565	19 2 57.82	164.18	25 1 34.8	419.6	75.55	16 22.1	59 58.4	I. S.
4 15.43	2.459	19 35 10.40	157.81	-23 25 17.8	+540.1	74.04	16 16.3	59 37.1	I. S.
16 44.27	2.347	20 6 3.67	151.05	21 26 49.3	641.5	72.40	16 10.1	59 14.3	I. S.
5 11.76	2.236	20 35 35.97	144.38	19 9 58.8	723.9	70.74	16 3.6	58 50.6	I. S.
17 37.96	2.132	21 3 50.52	138.14	16 38 27.0	788.5	69.14	15 57.0	58 26.5	I. S.
6 2.98	2.040	21 30 53.98	132.56	-13 55 37.8	+837.0	67.69	15 50.5	58 2.5	I. S.
18 26.97	1.960	21 56 55.19	127.78	11 4 32.7	871.0	66.41	15 44.1	57 39.1	I. S.
6 50.08	1.895	22 22 4.05	123.84	8 7 53.0	892.9	65.33	15 37.9	57 16.4	I. S.
19 12.49	1.844	22 46 30.92	120.78	5 7 59.4	904.0	64.46	15 32.0	56 54.7	I. S.
7 34.38	1.807	23 10 26.06	118.56	-2 6 56.8	+905.0	63.84	15 26.4	56 34.2	I. S.

Oct. 27, U Defective Illumination of S. 0°.01.

[Eph 15]

AT TRANSIT OF MOON'S CENTER OVER THE MERIDIAN OF WASHINGTON.

Date.	Culmination.	Mean Time of Transit.		Diff. for 1 Hour of Long.	Right Ascension of Center.		Diff. for 1 Hour of Long.	Geocentric Declination of Center.		Diff. for 1 Hour of Long.	Sid. Time of Semid. Passing Meridian.	Geocentric Semidiameter.	Equatorial Horizontal Parallax.	Bright Limbs.	
		h m	m		h m s	s		° ' "	"	"	s	" "	" "	I.	S.
Nov. 15	L	19 55.91	1.783		23 33 59.46	117.16		+ 0 53 22.3	+896.9	63.42	15 21.2	56 14.9	I.	S.	
16	U	8 17.23	1.773		23 57 20.57	116.51		3 51 15.0	880.6	63.20	15 16.3	55 56.9	I.	S.	
16	L	20 38.49	1.774		0 20 38.27	116.58		6 45 3.9	856.3	63.19	15 11.8	55 40.3	I.	S.	
17	U	8 59.84	1.786		0 44 0.80	117.29		9 33 14.8	824.3	63.36	15 7.6	55 25.0	I.	S.	
17	L	21 21.39	1.807		1 7 35.55	118.59	+12 14 15.5	+784.5	63.69	15 3.8	55 11.0	I.	S.		
18	U	9 43.25	1.837		1 31 29.02	120.40	14 46 32.6	737.0	64.15	15 0.3	54 58.3	I.	S.		
18	L	22 5.51	1.874		1 55 46.65	122.61	17 8 32.4	681.6	64.72	14 57.1	54 46.7	I.	S.		
19	U	10 28.24	1.915		2 20 32.56	125.09	19 18 41.2	618.4	65.37	14 54.3	54 36.4	I.	N.S.		
19	L	22 51.49	1.959		2 45 49.30	127.71	+21 15 24.8	+547.5	66.06	14 51.8	54 27.2	I.	N.S.		
20	U	11 15.26	2.002		3 11 37.66	130.33	22 57 12.1	469.1	66.74	14 49.6	54 19.1	I.	N.S.		
20	L	23 39.53	2.043		3 37 56.40	132.75	24 22 37.6	384.0	67.38	14 47.8	54 12.3	I.	II.N.		
21	U	12 4.25	2.077		4 4 42.18	134.81	25 30 24.7	292.9	67.92	14 46.3	54 6.7	II.N.			
22	L	0 29.34	2.102		4 31 49.72	136.35	+26 19 29.9	+197.2	68.33	14 45.1	54 2.4	II.N.			
22	U	12 54.67	2.117		4 59 11.98	137.24	26 49 6.4	+ 98.4	68.58	14 44.3	53 59.5	II.N.			
23	L	1 20.11	2.120		5 26 40.74	137.43	26 58 47.3	- 1.8	68.65	14 43.9	53 58.1	II.N.			
23	U	13 45.51	2.111		5 54 7.27	136.88	26 48 26.6	101.6	68.53	14 43.9	53 58.2	II.N.			
24	L	2 10.73	2.091		6 21 23.10	135.66	+26 18 19.9	-199.2	68.25	14 44.4	54 0.0	II.N.S.			
24	U	14 35.66	2.061		6 48 20.80	133.88	25 29 2.3	293.1	67.82	14 45.4	54 3.7	II.N.S.			
25	L	3 0.18	2.025		7 14 54.39	131.66	24 21 24.8	382.3	67.27	14 46.9	54 9.3	II. S.			
25	U	15 24.23	1.984		7 40 59.97	129.22	22 56 31.3	465.7	66.67	14 49.0	54 17.0	II. S.			
26	L	3 47.79	1.942		8 6 35.67	126.73	+21 15 34.0	-542.8	66.03	14 51.7	54 26.9	II. S.			
26	U	16 10.86	1.903		8 31 41.73	124.33	19 19 49.5	613.5	65.41	14 55.0	54 39.0	II. S.			
27	L	4 33.47	1.867		8 56 20.32	122.17	17 10 36.5	677.6	64.86	14 59.0	54 53.5	II. S.			
27	U	16 55.69	1.837		9 20 35.25	120.40	14 49 13.9	735.1	64.40	15 3.6	55 10.4	II. S.			
28	L	5 17.60	1.816		9 44 31.83	119.13	+12 17 0.1	-786.1	64.06	15 8.8	55 29.7	II. S.			
28	U	17 39.31	1.805		10 8 16.57	118.44	9 35 13.2	830.7	63.88	15 14.7	55 51.3	II. S.			
29	L	6 0.96	1.804		10 31 56.97	118.42	6 45 12.1	868.4	63.88	15 21.2	56 15.1	II. S.			
29	U	18 22.67	1.816		10 55 41.51	119.13	3 48 20.1	899.0	64.08	15 28.3	56 40.9	II. S.			
30	L	6 44.60	1.842		11 19 39.38	120.65	+ 0 46 6.2	-921.8	64.49	15 35.8	57 8.4	II. S.			
30	U	19 6.92	1.881		11 44 0.58	123.04	- 2 19 49.7	935.8	65.12	15 43.7	57 37.4	II. S.			
Dec. 1	L	7 29.80	1.935		12 8 55.64	126.31	5 27 33.5	939.6	65.98	15 51.8	58 7.3	II. S.			
1	U	19 53.43	2.005		12 34 35.56	130.51	8 34 51.9	931.2	67.08	16 0.1	58 37.6	II. S.			
2	L	8 17.99	2.090		13 1 11.45	135.63	-11 39 7.9	-908.7	68.39	16 8.3	59 7.7	II. S.			
2	U	20 43.66	2.190		13 28 54.02	141.59	14 37 16.9	869.7	69.90	16 16.2	59 36.7	II. S.			
3	L	9 10.59	2.301		13 57 52.75	148.27	17 25 44.5	811.5	71.56	16 23.6	60 4.0	II. S.			
3	U	21 38.91	2.419		14 28 14.68	155.41	20 0 28.4	732.0	73.29	16 30.3	60 28.7	II. S.			
4	L	10 8.66	2.538		15 0 2.84	162.58	-22 17 4.1	-630.1	75.01	16 36.1	60 49.8	II. S.			
4	U	22 39.80	2.649		15 33 14.45	169.22	24 10 59.0	595.5	76.57	16 40.7	61 6.7	II. S.			
5	L	11 12.16	2.740		16 7 39.50	174.69	25 37 53.7	366.6	77.84	16 44.0	61 18.7	II. S.			
5	U	23 45.44	2.801		16 42 59.99	178.35	26 34 9.2	199.9	78.68	16 45.8	61 25.3	II. S.			
6	L	12 19.22	2.823		17 18 50.89	179.71	-26 57 16.4	- 30.4	79.00	16 46.0	61 26.3	II. S.			
7	U	0 53.02	2.804		17 54 43.08	178.56	26 46 17.8	+139.5	78.74	16 44.7	61 21.5	I. N.			
7	L	13 26.36	2.746		18 30 6.96	175.05	26 1 58.2	301.7	77.95	16 41.9	61 11.3	I. N.			
8	U	1 58.80	2.656		19 4 36.93	169.66	24 46 34.4	449.2	76.72	16 37.8	60 56.1	I. N.			
8	L	14 30.03	2.546		19 37 54.09	163.03	-23 3 34.7	+577.2	75.17	16 32.5	60 36.7	I. N.			

Nov. 19, U Defective Illumination of N. 0' 10.

Nov. 20, U Defective Illumination of S. 0' 92.

Nov. 24, U Defective Illumination of N. 0' 25.

F MOON'S CENTER OVER THE MERIDIAN OF WASHINGTON.

Diff. for 1 Hour of Long.	Right Ascension of Center.	Diff. for 1 Hour of Long.	Geocentric Declination of Center.	Diff. for 1 Hour of Long.	Sid. Time of Semi- Pass- ing Me- ridian.	Geocen- tric Semi-di- ameter.	Equa- torial Hori- zontal Parallax.	Bright Limbs.	
m	h m s	s	" ' "	" "	s	" "	" "		
2.420	20 9 47.52	155.83	-20 57 9.0	+683.4	73.45	16 26.2	60 13.7	I.	S.
2.306	20 40 13.66	148.58	18 31 41.3	767.6	71.69	16 19.2	59 47.9	I.	S.
2.192	21 0 15.01	141.74	15 51 28.7	831.1	69.99	16 11.7	59 20.3	I.	S.
2.090	21 36 58.28	135.60	13 0 27.5	876.1	68.44	16 3.9	58 51.5	I.	S.
2.002	22 3 32.79	130.30	-10 2 6.0	+904.9	67.06	15 55.9	58 22.4	I.	S.
1.929	22 29 9.19	125.93	6 59 25.0	919.8	65.91	15 48.1	57 53.6	I.	S.
1.872	22 53 58.63	122.49	3 54 58.2	922.8	64.98	15 40.4	57 25.4	I.	S.
1.830	23 18 12.18	119.95	-0 50 57.9	915.7	64.28	15 33.0	56 58.5	I.	S.
1.802	23 42 0.55	118.27	+ 2 10 42.4	+899.7	63.81	15 26.1	56 33.2	I.	S.
1.788	0 5 33.84	117.31	5 8 22.3	875.8	63.57	15 19.7	56 9.6	I.	S.
1.786	0 29 1.47	117.31	8 0 30.9	844.5	63.53	15 13.8	55 47.9	I.	S.
1.796	0 52 32.11	117.97	10 45 42.3	806.2	63.66	15 8.4	55 28.2	I.	S.
1.816	1 16 13.60	119.11	+13 22 33.8	+761.1	63.97	15 3.6	55 10.6	I.	S.
1.845	1 40 12.78	120.84	15 49 43.2	709.2	64.42	14 59.4	54 55.1	I.	S.
1.880	2 4 35.33	123.00	18 5 47.3	650.3	64.97	14 55.7	54 41.6	I.	S.
1.921	2 29 25.60	125.44	20 9 21.9	584.3	65.60	14 52.6	54 30.0	I.	S.
1.964	2 54 46.34	128.04	+21 59 2.3	+511.3	66.26	14 49.9	54 20.3	I.	S.
2.007	3 20 38.37	130.62	23 33 25.0	431.4	66.91	14 47.8	54 12.4	I.	S.
2.047	3 47 0.45	133.01	24 51 10.2	345.2	67.51	14 46.1	54 6.2	I.	N.S.
2.081	4 13 49.21	135.03	25 51 6.4	253.4	68.00	14 44.8	54 1.6	I.	N.S.
2.105	4 40 59.18	136.53	+26 32 13.6	+157.2	68.37	14 44.0	53 58.5	I.	N.S.
2.119	5 8 23.12	137.34	26 53 48.2	+ 58.2	68.57	14 43.6	53 56.9	I.	N.
2.121	5 35 52.55	137.43	26 55 26.1	- 41.9	68.58	14 43.5	53 56.7	I.	N.
2.110	6 3 18.48	136.77	26 37 4.9	141.4	68.41	14 43.8	53 57.8	I.	II. N.S.
2.087	6 30 32.20	135.41	+25 59 4.3	-238.3	68.06	14 44.5	54 0.2	II.	N.S.
2.055	6 57 26.02	133.46	25 2 4.5	331.0	67.57	14 45.5	54 4.0	II.	N.S.
2.015	7 23 53.84	131.10	23 47 3.7	418.2	66.97	14 46.9	54 9.2	II.	N.S.
1.972	7 49 51.58	128.49	22 15 13.1	499.0	66.30	14 48.7	54 15.8	II.	S.
1.927	8 15 17.32	125.79	+20 27 54.2	-572.8	65.61	14 50.9	54 23.8	II.	S.
1.884	8 40 11.17	123.30	18 26 33.2	639.3	64.94	14 53.5	54 33.4	II.	S.
1.845	9 4 35.25	120.86	16 12 39.4	698.4	64.34	14 56.6	54 44.6	II.	S.
1.812	9 28 33.28	118.89	13 47 41.4	750.0	63.83	15 0.1	54 57.5	II.	S.
1.787	9 52 10.43	117.39	+11 13 6.6	-794.5	63.45	15 4.1	55 12.2	II.	S.
1.772	10 15 33.04	116.47	8 30 21.0	831.9	63.23	15 8.6	55 28.7	II.	S.
1.768	10 38 48.45	116.20	5 40 49.7	862.2	63.18	15 13.6	55 47.0	II.	S.
1.775	11 2 4 8.1	116.66	+ 2 45 58.4	885.2	63.33	15 19.0	56 7.1	II.	S.
1.795	11 25 31.08	117.87	- 0 12 44.0	-900.7	63.69	15 25.0	56 29.0	II.	S.
1.829	11 49 16.90	119.91	3 13 42.8	907.8	64.26	15 31.4	56 52.6	II.	S.
1.878	12 13 32.41	122.83	6 15 13.4	905.7	65.07	15 38.3	57 17.7	II.	S.
1.941	12 38 28.32	126.65	9 15 18.3	893.2	66.11	15 45.5	57 44.0	II.	S.
2.020	13 4 15.54	131.38	-12 11 41.7	-868.5	67.36	15 52.9	58 11.2	II.	S.
2.113	13 31 4 8.5	136.97	15 1 45.9	829.6	68.81	16 0.4	58 38.9	II.	S.
2.219	13 59 6.19	143.36	17 42 27.9	774.5	70.44	16 8.0	59 6.6	II.	S.
2.335	14 28 27.79	150.31	20 10 19.2	700.8	72.16	16 15.3	59 33.6	II.	S.
2.454	14 59 14.67	157.51	-22 21 26.6	-606.9	73.91	16 22.3	59 50.2	II.	S.

e Illumination of N. o".23.

e Illumination of S. o".39.

Dec. 21, U Defective Illumination of S. d".46.

Dec. 22, U Defective Illumination of N. d".14.

[Eph 13]

AT TRANSIT OF MOON'S CENTER OVER THE MERIDIAN OF WASHINGTON.

Date.	Culmination.	Mean Time of Transit.	Diff. for 1 Hour of Long.	Right Ascension of Center.	Diff. for 1 Hour of Long.	Geocentric Declination of Center.	Diff. for 1 Hour of Long.	Sid. Time of Semid. Passing Meridian.	Geocentric Semidiameter.	Equatorial Horizontal Parallax.	Bright Limbs.
		h m s	m	h m s	s	" ' "	"	s	" "	" "	
Jan. 0	U	11 48.65	2.240	6 27 42.73	144.60	+27 17 41.6	-201.0	70.71	15 6.2	55 20.1	I. N.
1	L	0 15.44	2.223	6 56 32.85	143.60	26 26 13.1	313.2	70.46	15 10.1	55 34.1	I. IL N.
1	U	12 41.95	2.193	7 25 5.78	141.77	25 12 41.8	421.1	70.00	15 14.0	55 48.5	IL N.S.
2	L	1 8.02	2.152	7 53 12.96	139.34	23 38 12.9	522.5	69.39	15 18.0	56 3.2	IL N.S.
2	U	13 33.57	2.106	8 20 48.54	136.55	+21 44 14.8	-615.7	68.69	15 22.1	56 18.1	IL N.S.
3	L	1 58.55	2.057	8 47 49.59	133.63	19 32 32.5	699.6	67.95	15 26.1	56 33.1	IL S.
3	U	14 22.95	2.010	9 14 16.04	130.81	17 5 3.0	773.5	67.23	15 30.2	56 48.2	IL S.
4	L	2 46.82	1.969	9 40 10.43	128.30	14 23 40.9	836.9	66.60	15 34.3	57 3.2	IL S.
4	U	15 10.24	1.935	10 5 37.38	126.27	+11 31 0.2	-889.6	66.08	15 38.4	57 18.2	IL S.
5	L	3 33.30	1.911	10 30 43.34	124.84	8 28 41.8	931.7	65.73	15 42.5	57 33.1	IL S.
5	U	15 56.15	1.899	10 55 36.10	124.10	5 19 2.4	963.1	65.56	15 46.5	57 48.0	IL S.
6	L	4 18.92	1.899	11 20 24.58	124.13	+ 2 4 11.6	983.6	65.60	15 50.6	58 2.8	IL S.
6	U	16 41.79	1.914	11 45 18.49	125.01	- 1 13 39.1	-992.9	65.86	15 54.6	58 17.4	IL S.
7	L	5 4.91	1.943	12 10 28.14	126.76	4 32 12.9	990.6	66.36	15 58.5	58 31.7	IL S.
7	U	17 28.48	1.987	12 36 4.22	129.42	7 49 5.4	975.9	67.08	16 2.3	58 45.7	IL S.
8	L	5 52.66	2.046	13 2 17.56	130.96	11 1 41.1	947.6	68.03	16 5.9	58 59.1	IL S.
8	U	18 17.64	2.119	13 29 18.64	137.35	-14 7 10.3	-904.6	69.18	16 9.3	59 11.7	IL S.
9	L	6 43.57	2.204	13 57 17.06	142.49	17 2 27.9	845.4	70.49	16 12.5	59 23.3	IL S.
9	U	19 10.59	2.299	14 26 20.65	148.18	19 44 12.2	768.8	71.92	16 15.3	59 33.6	IL S.
10	L	7 38.77	2.398	14 56 34.38	154.12	22 8 48.1	673.9	73.38	16 17.7	59 42.2	IL S.
10	U	20 8.13	2.494	15 27 58.98	159.91	-24 12 34.0	-560.6	74.77	16 19.4	59 48.7	IL S.
11	L	8 38.59	2.579	16 0 29.68	165.04	25 51 54.1	430.0	75.97	16 20.5	59 52.8	IL S.
11	U	21 9.96	2.645	16 33 55.33	168.98	27 3 35.6	284.8	76.88	16 20.9	59 54.2	IL S.
12	L	9 41.95	2.682	17 7 58.41	171.22	27 45 9.2	-129.5	77.38	16 20.5	59 52.5	IL N.
12	U	22 14.19	2.686	17 42 16.42	171.43	-27 55 8.5	+ 29.8	77.41	16 19.2	59 47.7	IL N.
13	L	10 46.26	2.654	18 16 24.42	169.55	27 33 23.2	186.7	76.93	16 17.0	59 39.6	IL N.
13	U	23 17.77	2.592	18 49 58.28	165.79	26 41 1.6	334.8	76.01	16 13.9	59 28.2	
14	L	11 48.37	2.505	19 22 37.63	160.56	25 20 21.9	469.0	74.73	16 9.9	59 13.8	
15	U	0 17.82	2.402	19 54 7.85	154.36	-23 34 33.8	+585.8	73.22	16 5.2	58 56.6	
15	L	12 45.90	2.292	20 24 20.80	147.76	21 27 17.9	683.5	71.58	15 59.9	58 37.0	
16	U	1 12.83	2.183	20 53 14.18	141.17	19 2 24.9	762.0	69.92	15 54.0	58 15.4	I.
16	L	13 38.40	2.079	21 20 50.47	134.96	16 23 40.4	822.3	68.33	15 47.7	57 52.4	I.
17	U	2 2.78	1.986	21 47 15.63	129.35	-13 34 33.7	+866.0	66.87	15 41.2	57 28.5	I.
17	L	14 26.11	1.905	22 12 37.77	124.47	10 38 12.7	895.0	65.59	15 34.6	57 4.2	I.
18	U	2 48.55	1.838	22 37 6.24	120.41	7 37 22.4	911.2	64.51	15 28.0	56 40.1	I.
18	L	15 10.27	1.784	23 0 50.97	117.19	4 34 25.1	916.5	63.64	15 21.6	56 16.6	I.
19	U	3 31.42	1.744	23 24 1.93	114.79	- 1 31 23.0	+912.3	63.00	15 15.5	55 54.3	I.
19	L	15 52.18	1.717	23 46 49.00	113.20	+ 1 29 57.4	899.8	62.59	15 9.9	55 33.5	I.
20	U	4 12.70	1.704	0 9 21.69	112.38	4 28 3.8	880.0	62.38	15 4.7	55 14.5	I.
20	L	16 33.13	1.703	0 31 49.21	112.32	7 21 32.9	853.6	62.39	15 0.1	54 57.7	I.
21	U	4 53.62	1.714	0 54 20.33	112.97	+10 9 7.4	+821.0	62.60	14 56.2	54 43.3	I.
21	L	17 14.31	1.736	1 17 3.37	114.30	12 49 33.0	782.2	62.99	14 53.0	54 31.5	I.
22	U	5 35.32	1.768	1 40 6.09	116.26	15 21 35.2	737.1	63.55	14 50.5	54 22.4	I.
22	L	17 56.79	1.810	2 3 35.68	118.77	17 43 57.1	685.5	64.26	14 48.8	54 16.1	I.
23	U	6 18.80	1.866	2 27 38.44	121.77	+19 55 18.0	+626.8	65.08	14 47.8	54 12.6	I.

Jan. 1, U Defective Illumination of S. o' n. 8.

Jan. 2, U Defective Illumination of N. r' n. 8.

[Eph 13]

FOR TRANSIT AT WASHINGTON.

ste.	Mean Time of Transit.			Apparent Right Ascension.			Apparent Declination.			Hor. Par.	Semidiam.	S. T. of Sem. Pass. Mer.	Date.	Mean Time of Transit.			Apparent Right Ascension.			Apparent Declination.			Hor. Par.	Semidiam.	S. T. of Sem. Pass. Mer.
	h	m	s	h	m	s	°	'	"	"	s			h	m	s	h	m	s	°	'	"	"	s	
M.	1	22	38	23	17	15.76	-	7	9	36.6	8.0	3.0	0.21	May 17	1	8	4	45	12.50	+24	28	12.8	7.9	3.0	0.22
	2	22	39	23	22	43.23	-	6	37	35.9	7.9	3.0	0.20	18	1	11	4	52	48.26	24	44	50.5	8.1	3.1	0.22
	3	22	41	23	28	15.31	-	6	4	21.9	7.9	3.0	0.20	19	1	15	5	0	12.56	24	59	1.9	8.2	3.1	0.23
	4	22	42	23	33	51.96	-	5	29	55.7	7.8	2.9	0.20	20	1	18	5	7	24.72	25	10	51.2	8.4	3.2	0.23
	5	22	44	23	39	33.13	-	4	54	18.6	7.7	2.9	0.20	21	1	21	5	14	24.11	25	20	23.4	8.5	3.2	0.24
	6	22	46	23	45	18.81	-	4	17	32.1	7.6	2.9	0.19	22	1	24	5	21	10.18	+25	27	44.0	8.7	3.3	0.24
	7	22	48	23	51	9.02	-	3	39	37.4	7.5	2.9	0.19	23	1	27	5	27	42.42	25	32	58.8	8.9	3.4	0.25
	8	22	50	23	57	3.82	-	3	0	36.0	7.4	2.8	0.19	24	1	29	5	34	0.34	25	36	13.8	9.1	3.4	0.25
	9	22	52	0	3	3.27	-	2	20	29.2	7.4	2.8	0.19	25	1	31	5	40	3.49	25	37	35.1	9.3	3.5	0.26
	10	22	54	0	9	7.46	-	1	39	18.4	7.3	2.8	0.19	26	1	33	5	45	51.47	25	37	8.8	9.5	3.6	0.27
	11	22	56	0	15	16.49	-	0	57	5.2	7.2	2.8	0.18	27	1	34	5	51	23.89	+25	35	1.1	9.7	3.7	0.27
	12	22	58	0	21	30.51	-	0	13	51.2	7.2	2.7	0.18	28	1	36	5	56	40.35	25	31	17.9	9.9	3.8	0.28
	13	23	1	0	27	49.66	+	0	30	21.8	7.1	2.7	0.18	29	1	37	6	1	40.48	25	26	5.4	10.2	3.9	0.28
	14	23	3	0	34	14.10	-	1	15	31.8	7.1	2.7	0.18	30	1	38	6	6	23.91	25	19	29.8	10.4	4.0	0.29
	15	23	6	0	40	44.03	-	2	1	36.7	7.0	2.7	0.18	31	1	38	6	10	50.30	25	11	36.9	10.6	4.0	0.30
	16	23	8	0	47	19.63	+	2	48	34.3	6.9	2.6	0.18	June 1	1	38	6	14	59.29	+25	2	32.4	10.9	4.1	0.30
	17	23	11	0	54	1.12	-	3	36	22.0	6.9	2.6	0.18	2	1	38	6	18	50.52	24	52	22.1	11.1	4.2	0.31
	18	23	14	1	0	48.72	-	4	24	56.9	6.9	2.6	0.17	3	1	38	6	22	23.64	24	41	11.8	11.4	4.3	0.32
	19	23	17	1	7	42.65	-	5	14	15.8	6.8	2.6	0.17	4	1	37	6	25	38.32	24	29	7.0	11.7	4.4	0.32
	20	23	20	1	14	43.12	-	6	4	14.9	6.8	2.6	0.17	5	1	36	6	28	34.24	24	16	13.0	11.9	4.5	0.33
	21	23	23	1	21	50.35	+	6	54	50.1	6.7	2.6	0.17	6	1	35	6	31	11.09	+24	2	35.3	12.2	4.6	0.34
	22	23	26	1	29	4.53	-	7	45	56.5	6.7	2.5	0.17	7	1	33	6	33	28.57	23	48	19.1	12.4	4.7	0.34
	23	23	30	1	36	25.83	-	8	37	28.9	6.7	2.5	0.17	8	1	31	6	35	26.43	23	33	29.8	12.7	4.8	0.35
	24	23	33	1	43	54.39	-	9	29	21.2	6.7	2.5	0.17	9	1	29	6	37	4.49	23	18	12.7	13.0	4.9	0.36
	25	23	37	1	51	30.28	-	10	21	26.5	6.6	2.5	0.17	10	1	26	6	38	22.60	23	2	33.0	13.3	5.0	0.36
	26	23	41	1	59	13.54	+	11	13	37.3	6.6	2.5	0.17	11	1	23	6	39	20.67	+22	46	35.7	13.5	5.1	0.37
	27	23	45	2	7	4.14	-	12	5	45.0	6.6	2.5	0.17	12	1	20	6	39	58.74	22	30	26.0	13.8	5.2	0.38
	28	23	49	2	15	1.93	-	12	57	40.1	6.6	2.5	0.17	13	1	16	6	40	16.92	22	14	9.3	14.0	5.3	0.38
	29	23	53	2	23	6.65	-	13	49	12.4	6.6	2.5	0.17	14	1	12	6	40	15.46	21	57	50.7	14.3	5.4	0.39
	30	23	57	2	31	17.96	-	14	40	10.9	6.6	2.5	0.17	15	1	8	6	39	54.79	21	41	35.6	14.5	5.5	0.40
Y.	2	0	1	2	39	35.38	+	15	30	23.8	6.6	2.5	0.18	16	1	4	6	39	15.47	+21	25	29.3	14.7	5.6	0.40
	3	0	6	2	47	58.29	-	16	19	38.8	6.7	2.5	0.18	17	0	59	6	38	18.26	21	9	37.1	14.9	5.7	0.41
	4	0	10	2	56	25.93	-	17	7	43.4	6.7	2.5	0.18	18	0	54	6	37	4.09	20	54	4.6	15.1	5.7	0.41
	5	0	15	3	4	57.42	-	17	54	24.8	6.7	2.6	0.18	19	0	48	6	35	34.13	20	38	57.6	15.3	5.8	0.41
	6	0	20	3	13	31.75	-	18	39	30.5	6.8	2.6	0.18	20	0	42	6	33	49.77	20	24	21.6	15.5	5.9	0.42
	7	0	24	3	22	7.81	+	19	22	48.8	6.9	2.6	0.18	21	0	36	6	31	52.62	+20	10	22.3	15.6	5.9	0.42
	8	0	29	3	30	44.40	-	20	4	8.6	6.9	2.6	0.19	22	0	30	6	29	44.47	19	57	5.6	15.7	5.9	0.42
	9	0	33	3	39	20.26	-	20	43	19.9	7.0	2.7	0.19	23	0	24	6	27	27.32	19	44	37.3	15.7	6.0	0.42
	10	0	38	3	47	54.12	-	21	20	14.4	7.1	2.7	0.19	24	0	18	6	25	3.36	19	33	3.0	15.8	6.0	0.42
	11	0	43	3	56	24.69	-	21	54	44.9	7.2	2.7	0.20	25	0	12	6	22	34.89	19	22	28.2	15.8	6.0	0.42
	12	0	47	4	4	50.71	+	22	26	45.9	7.3	2.8	0.20	26	0	5	6	20	4.33	+19	12	58.0	15.8	6.0	0.42
	13	0	52	4	13	10.97	-	22	56	13.8	7.4	2.8	0.20	26	23	59	6	17	34.15	19	4	37.2	15.7	6.0	0.42
	14	0	56	4	21	24.31	-	23	23	6.4	7.5	2.8	0.21	27	23	52	6	15	6.84	18	57	30.1	15.6	5.9	0.42
15	1	0	4	29	29.66	-	23	47	23.2	7.6	2.9	0.21	28	23	46	6	12	44.83	18	51	40.4	15.5	5.9	0.41	
16	1	4	4	37	26.03	-	24	9	4.7	7.7	2.9	0.21	29	23	40	6	10	30.47	18	47	11.1	15.3	5.8	0.41	
17	1	8	4	45	12.50	+	24	28	12.8	7.9	3.0	0.22	30	23	34	6	8	25.99	+18	44	4.2	15.1	5.8	0.40	
18	1	11	4	52	48.26	+	24	44	50.5	8.1	3.1	0.22	July 1	23	28	6	6	33.47	+18	42	21.1	14.9	5.7	0.40	

AT TRANSIT OF MOON'S CENTER OVER THE MERIDIAN OF WASHINGTON.

Date.	Culmination.	Mean Time of Transit.	Diff. for 1 Hour of Long.	Right Ascension of Center.	Diff. for 1 Hour of Long.	Geocentric Declination of Center.	Diff. for 1 Hour of Long.	Sid. Time of Semid. Passing Meridian.	Geocentric Semidiameter.	Equatorial Horizontal Parallax.	Bright Limbs.
		h m	m	h m s	s	" ' "	"	s	" "	" "	
Feb. 15	U	1 23.77	1.793	23 2 29.11	117.77	- 4 19 10.3	+ 924.4	63.67	15 22.1	56 18.4	I. S.
15	L	13 45.08	1.759	23 25 49.09	115.70	- 1 14 24.9	921.6	63.11	15 17.0	55 59.5	I. S.
16	U	2 6.04	1.737	23 48 48.67	114.36	+ 1 48 50.6	909.6	62.76	15 12.0	55 41.2	I. S.
16	L	14 26.81	1.726	0 11 36.45	113.72	4 48 51.5	889.3	62.62	15 7.3	55 23.9	I. S.
17	U	2 47.52	1.727	0 34 20.78	113.77	+ 7 44 3.4	+ 861.4	62.67	15 2.9	55 7.8	I. S.
17	L	15 8.31	1.739	0 57 9.60	114.48	10 32 57.9	826.4	62.89	14 58.9	54 53.3	I. S.
18	U	3 29.29	1.760	1 20 10.43	115.78	13 14 11.4	784.6	63.30	14 55.5	54 40.6	I. S.
18	L	15 50.59	1.791	1 43 30.29	117.63	15 46 22.7	736.0	63.86	14 52.6	54 30.0	I. S.
19	U	4 12.31	1.830	2 7 15.50	119.98	+18 8 10.4	+ 680.7	64.54	14 50.3	54 21.7	I. S.
19	L	16 34.55	1.876	2 31 31.53	122.75	20 18 12.2	618.4	65.33	14 48.8	54 16.0	I. S.
20	U	4 57.37	1.928	2 56 22.80	125.83	22 15 4.2	549.0	66.19	14 47.9	54 12.9	I. S.
20	L	17 20.83	1.982	3 21 52.30	129.10	23 57 19.5	472.3	67.09	14 47.8	54 12.5	I. S.
21	U	5 44.94	2.037	3 48 1.42	132.41	+25 23 30.3	+ 388.3	67.98	14 48.5	54 15.0	I. S.
21	L	18 9.70	2.089	4 14 49.51	135.57	26 32 9.5	297.1	68.82	14 50.0	54 20.4	I. S.
22	U	6 35.07	2.137	4 42 13.78	138.41	27 21 53.8	199.2	69.55	14 52.2	54 28.5	I. S.
22	L	19 0.95	2.176	5 10 9.27	140.75	27 51 27.1	+ 95.5	70.13	14 55.1	54 39.4	I. S.
23	U	7 27.24	2.204	5 38 29.02	142.43	+27 59 46.4	- 12.9	70.54	14 58.8	54 52.9	I. N.S.
23	L	19 53.79	2.219	6 7 4.54	143.36	27 46 5.4	124.3	70.76	15 3.2	55 8.8	I. N.S.
24	U	8 20.44	2.221	6 35 46.48	143.50	27 9 58.8	236.8	70.76	15 8.1	55 27.0	I. N.
24	L	20 47.05	2.211	7 4 25.58	142.89	26 11 25.4	348.4	70.57	15 13.6	55 47.0	I. N.
25	U	9 13.47	2.190	7 32 53.38	141.64	+24 50 48.9	- 457.0	70.20	15 19.4	56 8.6	I. N.
25	L	21 39.59	2.162	8 1 3.08	139.91	23 8 57.0	560.6	69.72	15 25.6	56 31.3	I. N.
26	U	10 5.33	2.128	8 28 49.68	137.88	21 7 0.8	657.4	69.16	15 32.0	56 54.8	I. N.
26	L	22 30.65	2.092	8 56 11.71	135.75	18 46 31.0	745.9	68.58	15 38.5	57 18.4	I. N.
27	U	10 55.55	2.059	9 23 8.37	133.72	+16 9 15.8	- 824.8	68.02	15 44.9	57 41.8	I. N.
27	L	23 20.08	2.030	9 49 42.19	131.97	13 17 18.8	892.8	67.53	15 51.0	58 4.4	I. N.
28	U	11 44.29	2.008	10 15 57.35	129.64	10 12 56.0	948.9	67.17	15 56.8	58 25.6	I. N.S.
Mar. 1	L	0 8.20	1.994	10 41 59.68	129.85	6 58 34.7	992.3	66.95	16 2.1	58 45.1	I. N.S.
1	U	12 32.20	1.992	11 7 56.23	129.70	+ 3 36 52.6	-1022.2	66.91	16 6.8	59 2.4	II. S.
2	L	0 56.14	2.001	11 33 55.09	130.24	+ 0 10 36.2	1037.9	67.06	16 10.8	59 17.2	II. S.
2	U	13 20.27	2.022	12 0 4.93	131.53	- 3 17 18.3	1038.6	67.42	16 14.1	59 29.2	II. S.
3	L	1 44.73	2.056	12 26 34.85	133.58	6 43 47.3	1023.6	67.99	16 16.6	59 38.2	II. S.
3	U	14 9.68	2.103	12 53 33.89	136.38	-10 5 39.3	- 992.3	68.75	16 18.2	59 44.2	II. S.
4	L	2 35.25	2.161	13 21 10.65	139.85	13 19 35.8	944.3	69.68	16 19.0	59 47.3	II. S.
4	U	15 1.57	2.228	13 49 32.63	143.89	16 22 13.4	879.1	70.75	16 19.1	59 47.6	II. S.
5	L	3 38.74	2.301	14 18 45.63	148.32	19 10 6.7	796.9	71.91	16 18.5	59 45.2	II. S.
5	U	15 56.81	2.377	14 48 52.75	152.86	-21 39 52.3	- 698.0	73.08	16 17.2	59 40.5	II. S.
6	L	4 25.77	2.449	15 19 53.50	157.19	23 48 15.7	583.5	74.18	16 15.4	59 33.7	II. S.
6	U	16 55.54	2.511	15 51 43.01	160.93	25 32 20.5	455.3	75.11	16 13.0	59 25.1	II. S.
7	L	5 25.97	2.556	16 24 11.72	163.65	26 49 39.7	316.4	75.79	16 10.3	59 15.1	II. S.
7	U	17 56.81	2.580	16 57 5.58	165.06	-27 38 26.9	- 170.7	76.13	16 7.3	59 4.0	II. S.
8	L	6 27.78	2.577	17 30 7.05	164.91	27 57 46.5	- 22.6	76.09	16 3.9	58 51.8	II. S.
8	U	18 58.56	2.549	18 2 57.22	163.18	27 47 40.0	+ 122.9	75.66	16 0.4	58 38.9	II. N.
9	L	7 28.85	2.496	18 35 17.74	160.01	27 9 3.7	261.9	74.87	15 56.8	58 25.5	II. N.
9	U	19 58.38	2.424	19 6 52.91	155.69	-26 3 44.0	+ 389.6	73.78	15 53.0	58 11.6	II. N.

Feb. 25, U Defective Illumination of N. o°.02.

{Eph 15}

Feb. 28, U Defective Illumination of S. o°.30

AT TRANSIT OF MOON'S CENTER OVER THE MERIDIAN OF WASHINGTON.

date.	Culmination.	Mean Time of Transit.	Diff. for 1 Hour of Long.	Right Ascension of Center.	Diff. for 1 Hour of Long.	Geocentric Declination of Center.	Diff. for 1 Hour of Long.	Sid. Time of Semid. Passing Meridian.	Geocentric Semidiameter.	Equatorial Horizontal Parallax.	Bright Limbs.
		h m	m	h m s	s	° ' "	"	s	"	"	
9	U	19 58.38	2.424	19 6 52.91	155.69	-26 3 44.0	+ 389.6	73.78	15 53.0	58 11.6	II. N.
10	L	8 26.97	2.339	19 37 31.11	150.58	24 34 4.3	504.6	72.48	15 49.1	57 57.5	II. N.
10	U	20 54.49	2.248	20 7 5 37	145.08	22 42 52.6	604.9	71.06	15 45.2	57 43.0	II. N.
11	L	9 20.91	2.156	20 35 33.14	139.56	20 33 9.3	689.9	69.61	15 41.2	57 28.3	II. N.
11	U	21 46.25	2.068	21 2 55.63	134.26	-18 7 55.8	+ 759.9	68.19	15 37.1	57 13.4	II. N.
12	L	10 10.57	1.987	21 29 17.00	129.40	15 30 8.7	815.6	66.87	15 33.0	56 58.3	II. N.
12	U	22 33.97	1.916	21 54 43.40	125.12	12 42 34.5	857.9	65.69	15 28.9	56 43.1	II. N.
13	L	10 56.58	1.855	22 19 22.26	121.49	9 47 48.3	887.8	64.67	15 24.7	56 27.9	II. N.
13	U	23 18.54	1.806	22 43 21.69	118.54	- 6 48 12.7	+ 906.3	63.84	15 20.5	56 12.6	
14	L	11 39.09	1.769	23 6 50.11	116.30	3 45 59.1	914.3	63.20	15 16.4	55 57.5	
15	U	0 1.06	1.744	23 29 55.92	114.77	- 0 43 8.6	912.6	62.77	15 12.4	55 42.5	
15	L	12 21.89	1.730	23 52 47.38	113.93	+ 2 18 26.8	901.9	62.53	15 8.4	55 28.0	
16	U	0 42.61	1.726	0 15 32.46	113.72	+ 5 17 2.1	+ 882.7	62.48	15 4.6	55 14.0	
16	L	13 3.35	1.732	0 38 18.79	114.13	8 10 58.7	855.4	62.61	15 1.0	55 0.8	
17	U	1 24.24	1.749	1 1 13.59	115.11	10 58 41.8	820.4	62.91	14 57.6	54 48.5	I. S.
17	L	13 45.37	1.775	1 24 23.51	116.64	13 38 39.4	777.9	63.36	14 54.6	54 37.4	I. S.
18	U	2 6.86	1.808	1 47 54.62	118.64	+16 9 21.9	+ 727.9	63.94	14 51.9	54 27.6	I. S.
18	L	14 28.79	1.848	2 11 52.26	121.04	18 29 20.2	670.5	64.64	14 49.7	54 19.5	I. S.
19	U	2 51.23	1.893	2 36 20.71	123.76	20 37 6.0	605.8	65.43	14 48.0	54 13.3	I. S.
19	L	15 14.24	1.942	3 1 23.10	126.67	22 31 11.1	533.8	66.26	14 46.9	54 9.0	I. S.
20	U	3 37.84	1.991	3 27 1.12	129.66	+24 10 8.8	+ 454.6	67.09	14 46.3	54 7.0	I. S.
20	L	16 2.03	2.040	3 53 14.76	132.59	25 32 35.0	368.6	67.91	14 46.4	54 7.4	I. S.
21	U	4 26.78	2.085	4 20 2.21	135.28	26 37 10.1	276.2	68.64	14 47.2	54 10.3	I. S.
21	L	16 52.03	2.123	4 47 19.69	137.57	27 22 41.9	178.3	69.27	14 48.7	54 15.8	I. S.
22	U	5 17.69	2.152	5 15 1.69	139.34	+27 48 9.4	+ 75.7	69.75	14 51.0	54 24.1	I. S.
22	L	17 43.64	2.171	5 43 1.21	140.49	27 52 44.7	- 30.2	70.06	14 54.0	54 35.2	I. S.
23	U	6 9.75	2.179	6 11 10.42	140.95	27 35 57.4	137.8	70.18	14 57.8	54 49.0	I. N. S.
23	L	18 35.88	2.175	6 39 21.12	140.73	26 57 35.3	245.6	70.12	15 2.3	55 5.5	I. N.
24	U	7 1.92	2.162	7 7 25.69	139.93	+25 57 45.8	- 352.1	69.91	15 7.5	55 24.5	I. N.
24	L	19 27.74	2.141	7 35 17.63	138.65	24 36 55.6	455.6	69.55	15 13.3	55 45.9	I. N.
25	U	7 53.27	2.114	8 2 52.10	137.06	22 55 49.2	554.6	69.11	15 19.7	56 9.4	I. N.
25	L	20 18.47	2.085	8 30 6.27	135.31	20 55 27.8	647.9	68.62	15 26.6	56 34.7	I. N.
26	U	8 43.32	2.056	8 56 59.42	133.58	+18 37 7.0	- 734.3	68.14	15 33.9	57 1.4	I. N.
26	L	21 7.84	2.031	9 23 32.96	132.06	16 2 16.3	812.7	67.70	15 41.4	57 29.0	I. N.
27	U	9 32.09	2.012	9 49 50.16	130.88	13 12 37.3	882.1	67.35	15 49.0	57 56.9	I. N.
27	L	21 56.15	2.000	10 15 55.98	130.19	10 10 5.9	941.3	67.13	15 56.5	58 24.5	I. N.
28	U	10 20.12	1.998	10 41 56.84	130.07	+ 6 56 50.4	- 989.2	67.07	16 3.8	58 51.2	I. N.
28	L	22 44.14	2.007	11 8 0.25	130.62	3 35 14.8	1024.5	67.19	16 10.6	59 16.4	I. N.
29	U	11 8.34	2.039	11 34 14.70	131.92	+ 0 7 58.3	1045.8	67.51	16 16.8	59 39.2	I. N.
29	L	23 32.88	2.063	12 0 49.22	133.98	- 3 22 2.4	1051.6	68.04	16 22.3	59 59.2	I. N. S.
30	U	11 57.91	2.110	12 27 53.17	136.82	- 6 51 33.3	-1040.6	68.78	16 26.8	60 15.7	I. II. S.
31	L	0 23.58	2.170	12 55 35.78	140.42	10 17 3.7	1011.3	69.71	16 30.2	60 28.3	II. S.
31	U	12 50.03	2.240	13 24 5 53	144.66	13 34 46.9	962.5	70.80	16 32.5	60 36.7	II. S.
31	L	1 17.38	2.319	13 53 29.44	149.38	16 40 45.2	893.7	72.02	16 33.6	60 40.7	II. S.
1	U	13 45.71	2.402	14 23 52.04	154.39	-19 30 55.9	- 804.7	73.29	16 33.5	60 40.4	II. S.

Mar. 23. U Defective Illumination of S. 0°.17.

Mar. 30. U Defective Illumination of N. 0°.22.

PATH OF THE ANNULUS DURING THE ANNULAR ECLIPSE OF
SUN, 1915, FEBRUARY 13.

Green- wich Mean Time	Northern Limit of Annulus Path.		Central Line.		Southern Limit of Annulus Path.		Du- ra- tion of An- nular Ecl. in Sec.
	Latitude.	Longitude from Greenwich.	Latitude.	Longitude from Greenwich.	Latitude.	Longitude from Greenwich.	
Limits.	° ' "	° ' "	° ' "	° ' "	° ' "	° ' "	m
14 ^h 45 ^m	-35 15.3	42 53.0 E.	-35 49.7	42 35.1 E.	-36 24.2	42 16.8 E.	2
50	37 8.9	51 23.7	37 23.0	49 33.4	37 27.1	46 55.8	2
55	39 4.7	64 9.0	39 32.7	63 35.1	40 0.8	62 58.7	2
15 0	39 36.9	71 35.1	40 5.5	71 16.0	40 34.1	70 55.9	2
5	-39 41.2	77 18.4	-40 9.2	77 7.5	-40 37.3	76 56.0	2
10	39 29.6	82 3.8	39 56.8	81 58.4	40 24.0	81 52.6	2
15	39 7.3	86 9.9	39 33.5	86 8.6	39 59.7	86 7.0	2
20	38 37.1	89 47.0	39 2.2	89 48.8	39 27.4	89 50.4	2
25	38 0.8	93 1.2	38 24.9	93 5.5	38 49.1	93 9.6	2
30	37 19.5	95 56.9	37 42.6	96 3.1	38 5.8	96 9.3	2
35	-36 34.2	98 37.2	-36 56.4	98 45.0	-37 18.7	98 52.9	2
40	35 45.6	101 4.3	36 6.9	101 13.5	36 28.3	101 22.7	2
45	34 53.9	103 20.1	35 14.4	103 30.5	35 35.0	103 40.8	2
50	33 59.8	105 26.2	34 19.5	105 37.4	34 39.3	105 48.7	2
55	33 3.4	107 23.6	33 22.4	107 35.7	33 41.4	107 47.7	2
16 0	32 5.0	109 13.6	32 23.3	109 26.3	32 41.7	109 39.0	2
5	-31 4.8	110 57.0	-31 22.5	111 10.3	-31 40.3	111 23.6	2
10	30 3.0	112 34.7	30 20.2	112 48.5	30 37.3	113 2.3	2
15	28 59.7	114 7.3	29 16.3	114 21.5	29 33.0	114 35.7	2
20	27 55.0	115 35.4	28 11.1	115 50.0	28 27.3	116 4.7	2
25	26 48.9	116 59.7	27 4.6	117 14.7	27 20.3	117 29.7	2
30	25 41.5	118 20.7	25 56.8	118 36.0	26 12.2	118 51.4	2
35	-24 32.9	119 38.9	-24 47.8	119 54.5	-25 2.9	120 10.2	2
40	23 23.0	120 54.8	23 37.7	121 10.7	23 52.4	121 26.8	2
45	22 11.9	122 8.8	22 26.3	122 25.0	22 40.8	122 41.4	2
50	20 59.6	123 21.4	21 13.8	123 38.0	21 28.0	123 54.6	2
55	19 46.0	124 33.0	20 0.0	124 49.9	20 14.1	125 7.0	2
17 0	18 31.1	125 44.2	18 45.0	126 1.4	18 58.9	126 18.8	2
5	-17 14.9	126 55.3	-17 28.7	127 12.9	-17 42.5	127 30.7	2
10	15 57.3	128 6.8	16 11.0	128 24.8	16 24.8	128 43.1	2
15	14 38.1	129 19.4	14 51.8	129 37.8	15 5.6	129 56.5	2
20	13 17.3	130 33.5	13 31.1	130 52.4	13 44.9	131 11.6	2
25	11 54.8	131 49.8	12 8.6	132 9.3	12 22.5	132 29.0	2
30	10 30.4	133 9.0	10 44.3	133 29.1	10 58.3	133 49.4	2
35	- 9 3.9	134 32.0	- 9 17.9	134 52.8	- 9 32.0	135 13.8	2
40	7 34.9	135 59.9	7 49.1	136 21.5	8 3.5	136 43.3	2
45	6 3.2	137 33.9	6 17.7	137 56.4	6 32.3	138 19.1	2
50	4 28.3	139 15.8	4 43.1	139 39.4	4 58.0	140 3.2	2
55	2 49.8	141 7.8	3 4.9	141 32.6	3 20.1	141 57.7	2
18 0	- 1 6.6	143 12.8	- 1 22.1	143 39.2	- 1 37.7	144 5.8	2
5	+ 0 42.4	145 35.4	+ 0 26.5	146 3.8	+ 0 10.4	146 32.4	2
10	2 39.0	148 22.8	2 22.7	148 53.8	2 6.1	149 25.2	2
15	4 46.8	151 48.0	4 30.0	152 23.0	4 13.1	152 58.6	2
20	7 12.8	156 19.2	6 56.0	157 1.7	6 39.2	157 45.2	2
Limits.	+13 46.2	174 39.3 E.	+13 9.8	174 53.8 E.	+12 33.3	175 8.5 E.	2

[Eph 15]

Note:- The hours of beginning and

A hand-drawn map of the Pacific Ocean showing the path of an eclipse. The map includes a grid of latitude and longitude lines. Key locations labeled include Japan, Polynesia, Australia, and New Zealand. The path of the eclipse is marked with a solid line, and the path of the sun is marked with a dashed line. The map is titled 'Greenwich 196' and '170'.

ressed in Greenwich Mean Time



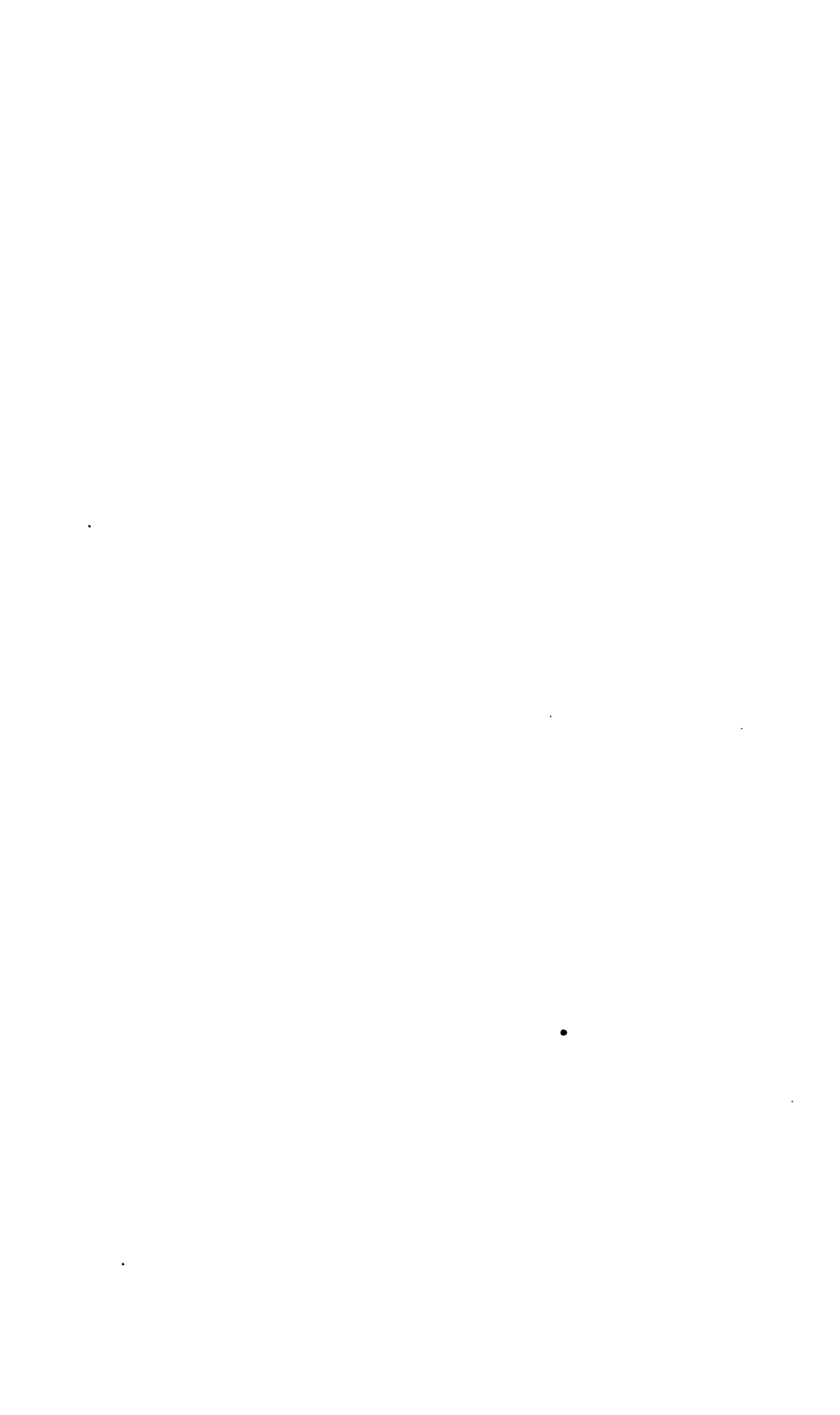
SELIAN ELEMENTS OF THE ANNULAR ECLIPSE OF THE SUN, 1915, AUGUST 10.

which can be used.	Coordinates of Center of Shadow on Fundamental Plane.		Direction of Axis of Shadow.			Radius of Penumbra and Shadow on Fundamental Plane.	
	x	y	$\log \sin d$	$\log \cos d$	μ	h_1	h_2
m							
50	-1.47199	+0.64791	+9.43296	+9.98344	116 10.2	+0.55487	+0.00891
0	-1.39095	+0.61301	+9.43290	+9.98344	118 40.2	+0.55486	+0.00890
10	1.30991	0.57810	9.43285	9.98345	121 10.2	0.55485	0.00889
20	1.22886	0.54319	9.43280	9.98345	123 40.2	0.55484	0.00888
30	1.14782	0.50826	9.43275	9.98345	126 10.3	0.55484	0.00887
40	1.06677	0.47333	9.43269	9.98346	128 40.3	0.55482	0.00886
50	0.98573	0.43840	9.43264	9.98346	131 10.3	0.55481	0.00885
0	-0.90468	+0.40346	+9.43259	+9.98347	133 40.3	+0.55480	+0.00884
10	0.82363	0.36851	9.43254	9.98347	136 10.4	0.55479	0.00883
20	0.74259	0.33356	9.43249	9.98347	138 40.4	0.55478	0.00882
30	0.66154	0.29860	9.43243	9.98348	141 10.4	0.55477	0.00881
40	0.58049	0.26363	9.43238	9.98348	143 40.5	0.55475	0.00879
50	0.49944	0.22866	9.43233	9.98349	146 10.5	0.55474	0.00878
0	-0.41839	+0.19368	+9.43228	+9.98349	148 40.5	+0.55472	+0.00876
10	0.33735	0.15870	9.43223	9.98350	151 10.5	0.55471	0.00875
20	0.25630	0.12372	9.43217	9.98350	153 40.6	0.55469	0.00873
30	0.17526	0.08872	9.43212	9.98350	156 10.6	0.55468	0.00872
40	0.09421	0.05372	9.43207	9.98351	158 40.6	0.55466	0.00870
50	-0.01317	+0.01872	9.43202	9.98351	161 10.6	0.55464	0.00868
0	+0.06787	-0.01629	+9.43196	+9.98352	163 40.7	+0.55462	+0.00866
10	0.14892	0.05130	9.43191	9.98352	166 10.7	0.55460	0.00864
20	0.22995	0.08632	9.43186	9.98352	168 40.7	0.55458	0.00862
30	0.31099	0.12135	9.43181	9.98353	171 10.8	0.55456	0.00860
40	0.39203	0.15638	9.43175	9.98353	173 40.8	0.55454	0.00858
50	0.47306	0.19141	9.43170	9.98354	176 10.8	0.55452	0.00856
0	+0.55409	-0.22645	+9.43165	+9.98354	178 40.8	+0.55450	+0.00854
10	0.63512	0.26149	9.43160	9.98354	181 10.9	0.55448	0.00852
20	0.71614	0.29654	9.43154	9.98355	183 40.9	0.55445	0.00849
30	0.79717	0.33159	9.43149	9.98355	186 10.9	0.55443	0.00847
40	0.87819	0.36665	9.43144	9.98356	188 40.9	0.55441	0.00845
50	0.95920	0.40171	9.43139	9.98356	191 11.0	0.55438	0.00842
0	+1.04022	-0.43678	+9.43134	+9.98357	193 41.0	+0.55436	+0.00840
10	1.12123	0.47185	9.43128	9.98357	196 11.0	0.55433	0.00837
20	1.20223	0.50692	9.43123	9.98357	198 41.0	0.55430	0.00835
30	1.28323	0.54200	9.43118	9.98358	201 11.1	0.55428	0.00832
40	1.36423	0.57708	9.43113	9.98358	203 41.1	0.55425	0.00829
50	+1.44523	-0.61216	+9.43107	+9.98359	206 11.1	+0.55422	+0.00826

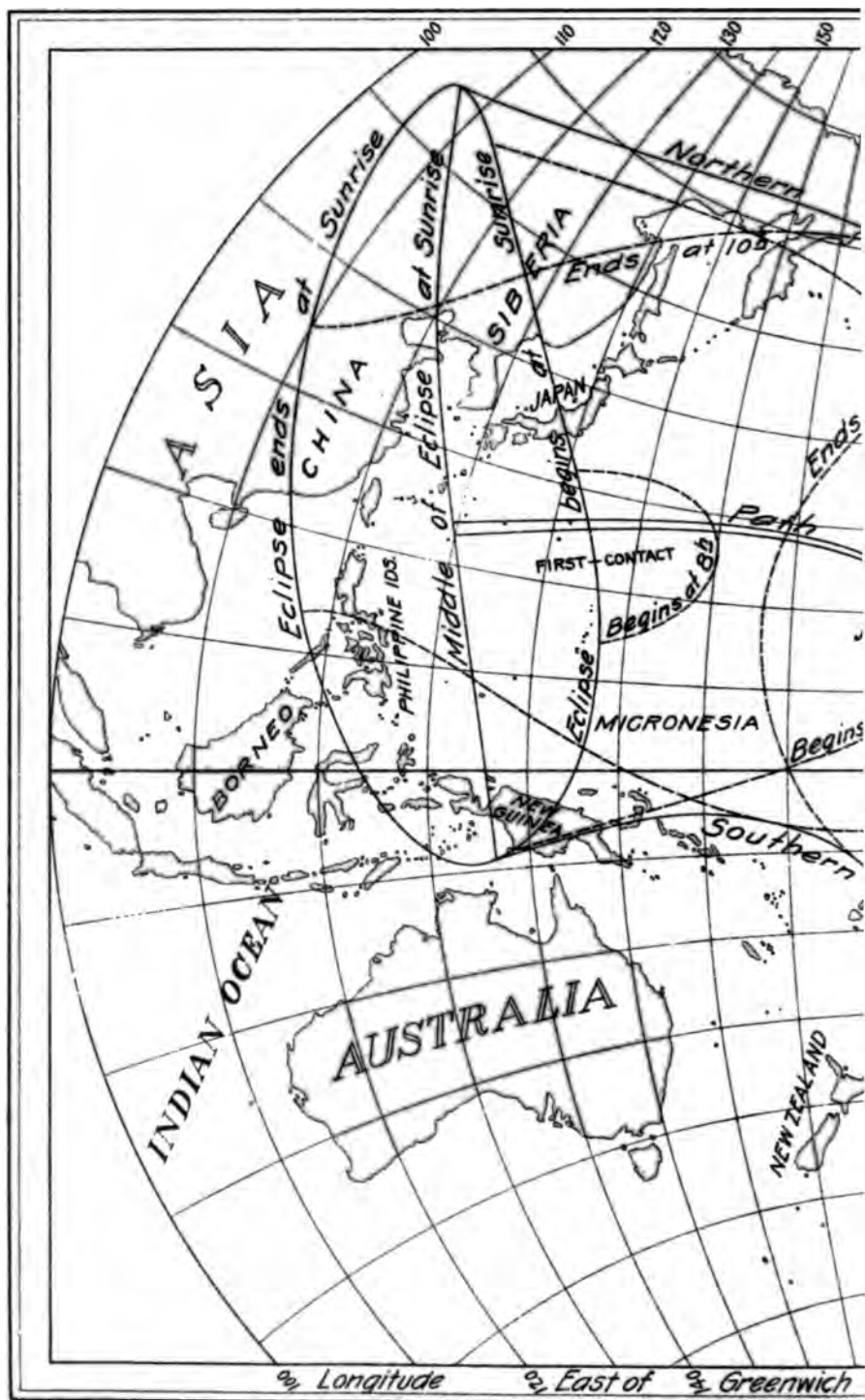
which Mean time.	$\log x'$ for 1 Minute.	$\log y'$ for 1 Minute.	$\log \mu'$ for 1 Minute.	Log Tangents of Angles of Cones.	
				Penumbra.	Shadow.
m					
0	+7.9086	-7.5424	+1.1762	+7.66403	+7.66186
0	7.9087	7.5429	1.1762	7.66403	7.66186
0	7.9087	7.5434	1.1762	7.66403	7.66186
0	7.9087	7.5438	1.1762	7.66404	7.66187
0	7.9087	7.5442	1.1762	7.66404	7.66187
0	7.9086	7.5446	1.1762	7.66404	7.66187
0	7.9085	7.5449	1.1762	7.66404	7.66188
0	+7.9084	-7.5452	+1.1762	+7.66405	+7.66188

PATH OF THE ANNULUS DURING THE ANNULAR ECLIPSE OF THE
SUN, 1915, AUGUST 10.

Green- wich Mean Time	Northern Limit of Annulus Path.		Central Line.		Southern Limit of Annulus Path.		Duration of Annulus on Central Line.
	Latitude.	Longitude from Greenwich.	Latitude.	Longitude from Greenwich.	Latitude.	Longitude from Greenwich.	
Limits.	+23 41.3	129 27.2 E.	+23 12.3	129 39.2 E.	+22 43.4	129 51.1 E.	m s
9 ^h 0 ^m	25 36.6	136 50.5	25 16.2	137 29.2	24 55.0	138 4.2	1 57.9
5	27 51.7	148 9.8	27 27.7	148 22.3	27 3.7	148 34.3	1 55.9
10	28 40.2	154 33.7	28 16.9	154 40.0	27 53.7	154 46.3	1 54.4
15	29 0.8	159 27.1	28 38.6	159 30.0	28 16.3	159 32.9	1 53.1
20	29 5.6	163 30.8	28 44.3	163 31.2	28 23.1	163 31.7	1 51.9
25	28 59.6	167 1.5	28 39.3	167 0.1	28 19.0	166 58.8	1 50.6
30	+28 45.5	170 8.0	+28 26.2	170 5.1	+28 6.8	170 2.4	1 49.4
35	28 25.2	172 55.9	28 6.7	172 51.8	27 48.1	172 47.9	1 48.2
40	27 59.6	175 28.7	27 42.0	175 23.7	27 24.3	175 18.9	1 47.0
45	27 29.7	177 49.0	27 12.8	177 43.3	26 55.9	177 37.6	1 45.8
50	26 56.0	179 58.8 E.	26 39.8	179 52.4 E.	26 23.6	179 46.1 E.	1 44.6
55	26 19.0	178 0.5 W.	26 3.5	178 7.4 W.	25 48.0	178 14.2 W.	1 43.5
10 0	+25 39.0	176 7.6	+25 24.2	176 14.9	+25 9.3	176 22.3	1 42.3
5	24 56.4	174 21.6	24 42.2	174 29.3	24 28.0	174 37.0	1 41.2
10	24 11.5	172 41.6	23 57.8	172 49.7	23 44.1	172 57.7	1 40.2
15	23 24.3	171 6.9	23 11.2	171 15.3	22 58.0	171 23.6	1 39.1
20	22 35.1	169 37.0	22 22.5	169 45.6	22 9.8	169 54.1	1 38.1
25	21 44.0	168 11.1	21 31.8	168 20.0	21 19.5	168 28.8	1 37.2
30	+20 51.1	166 49.0	+20 39.3	166 58.0	+20 27.4	167 7.0	1 36.5
35	19 56.4	165 30.0	19 45.0	165 39.2	19 33.5	165 48.4	1 35.5
40	19 0.1	164 13.8	18 49.0	164 23.2	18 37.8	164 32.6	1 34.8
45	18 2.2	163 0.0	17 51.3	163 9.6	17 40.4	163 19.1	1 34.1
50	17 2.6	161 48.2	16 52.0	161 57.9	16 41.4	162 7.6	1 33.5
55	16 1.5	160 38.0	15 51.1	160 47.9	15 40.7	160 57.8	1 33.0
11 0	+14 58.9	159 29.1	+14 48.7	159 39.2	+14 38.5	159 49.2	1 32.6
5	13 54.6	158 21.1	13 44.6	158 31.4	13 34.5	158 41.6	1 32.3
10	12 48.8	157 13.6	12 38.9	157 24.1	12 29.0	157 34.5	1 32.1
15	11 41.4	156 6.3	11 31.5	156 17.0	11 21.7	156 27.6	1 32.0
20	10 32.3	154 58.8	10 22.5	155 9.6	10 12.7	155 20.5	1 31.9
25	9 21.4	153 50.6	9 11.6	154 1.7	9 1.8	154 12.7	1 32.0
30	+ 8 8.7	152 41.3	+ 7 58.9	152 52.6	+ 7 49.1	153 3.9	1 32.2
35	6 54.0	151 30.4	6 44.1	151 42.0	6 34.3	151 53.6	1 32.5
40	5 37.2	150 17.3	5 27.3	150 29.3	5 17.4	150 41.2	1 32.9
45	4 18.2	149 1.4	4 8.1	149 13.8	3 58.1	149 26.1	1 33.4
50	2 56.7	147 42.0	2 46.5	147 54.7	2 36.3	148 7.4	1 34.0
55	1 32.4	146 17.9	+ 1 22.0	146 31.1	+ 1 11.6	146 44.3	1 34.8
12 0	+ 0 5.1	144 48.2	- 0 5.5	145 2.0	- 0 16.2	145 15.6	1 35.6
5	- 1 25.7	143 11.5	1 36.7	143 25.8	1 47.6	143 40.0	1 36.6
10	3 0.6	141 25.8	3 11.9	141 40.8	3 23.3	141 55.7	1 37.6
15	4 40.4	139 28.6	4 52.2	139 44.3	5 3.9	140 0.0	1 38.8
20	6 26.2	137 16.2	6 38.5	137 32.9	6 50.7	137 49.5	1 40.2
25	8 19.6	134 43.2	8 32.5	135 1.0	8 45.4	135 18.8	1 41.7
30	-10 23.5	131 40.1	-10 37.2	131 59.5	-10 50.7	132 18.9	1 43.2
35	12 43.2	127 49.0	12 57.7	128 10.8	13 12.1	128 32.4	1 45.0
40	15 31.9	122 24.4	15 47.2	122 50.8	16 2.4	123 16.7	1 47.0
45	20 16.2	110 21.0	20 24.0	111 28.6	20 33.9	112 26.8	1 52.0
Limits.	-21 28.2	106 20.2 W.	-21 55.9	106 31.3 W.	-22 23.4	106 42.4 W.	. . .

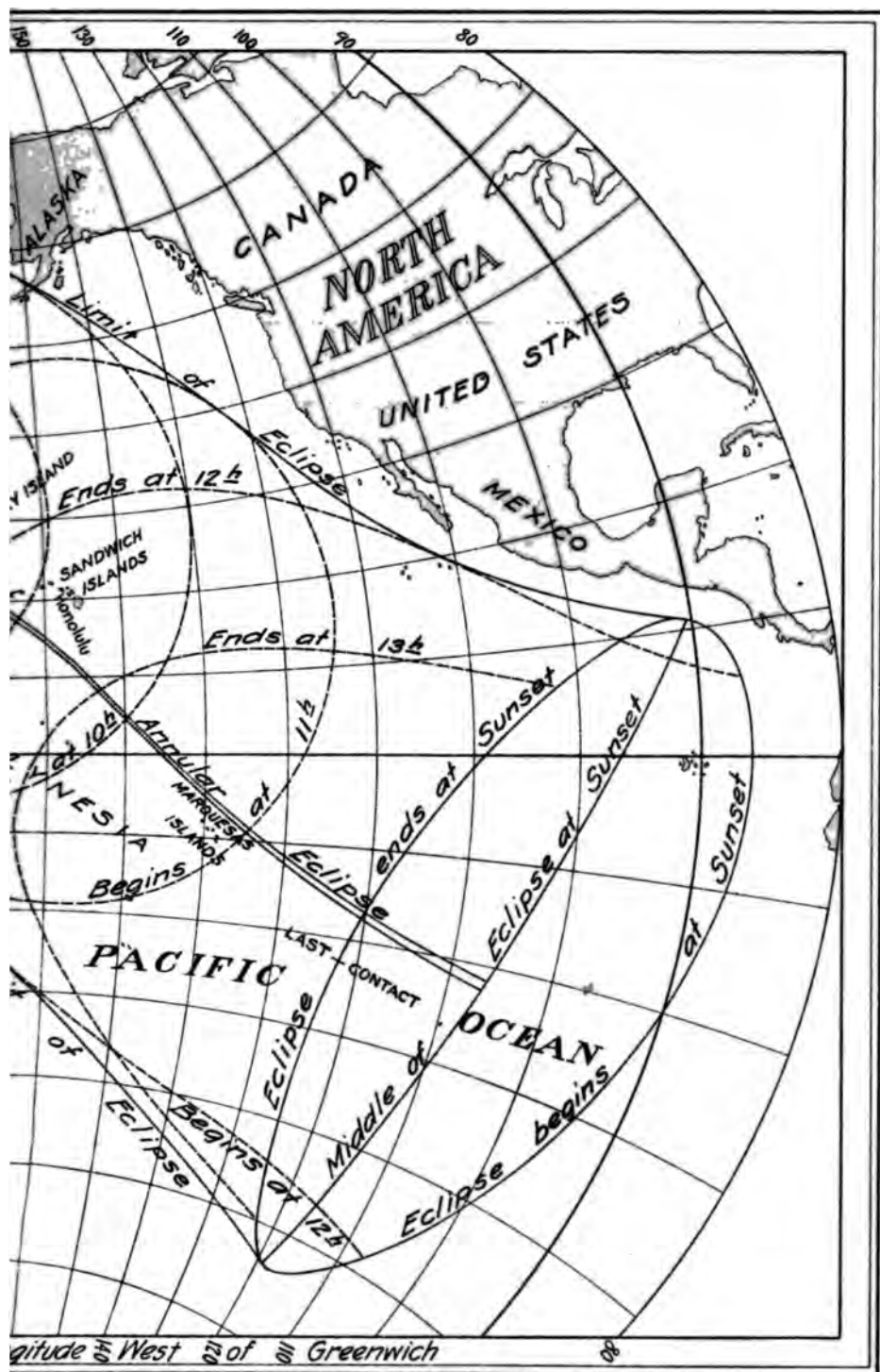


ANNULAR ECLIPSE



Note:— The hours of beginning and end

' AUGUST 10TH 1915.



expressed in Greenwich Mean Time.





MEAN PLACES FOR 1915.0. (January 0^d.732, Washington.)

name of Star.	Magni- tude.	Right Ascension.	Annual Proper Motion.	Declination.	Annual Proper Motion.
		h m s	s	° ' "	"
ium . . .	5.4	0 16 13.390	+0.0003	+ 7 43 5.84	+0.016
ium . . .	5.6	0 28 0.570	+0.0021	6 29 10.36	+0.009
ium . . .	6.5	0 36 48.256	-0.0084	8 53 28.82	-0.082
ium . . .	6.3	1 2 5.198	+0.0012	12 30 2.93	+0.042
ium . . .	3.7	1 26 55.924	+0.0015	14 54 28.83	-0.003
ium . . .	6.2	1 31 13.615	+0.0010	+14 13 38.20	-0.001
ium . . .	6.1	1 35 5.480	+0.0053	15 58 30.03	-0.006
etis . . .	6.4	1 41 58.256	+0.0031	16 59 15.36	+0.015
etis . . .	5.8	1 43 34.117	+0.0035	16 31 58.20	-0.021
etis . . .	5.1	1 52 42.233	+0.0021	17 24 10.70	-0.020
etis . . .	6.4	1 59 2.694	-0.0008	+17 50 42.79	-0.018
etis . . .	6.5	2 3 5.709	-0.0037	17 37 29.77	-0.007
etis . . .	6.4	2 4 42.760	+0.0112	16 49 34.07	-0.179
etis . . .	5.9	2 5 54.696	+0.0059	19 5 59.00	-0.032
etis . . .	5.6	2 13 23.670	-0.0007	19 30 30.57	-0.003
etis . . .	6.2	2 25 52.191	+0.0050	+19 28 43.17	-0.022
etis . . .	5.4	2 33 59.203	+0.0001	21 35 39.06	-0.021
etis . . .	5.7	2 37 34.221	+0.0023	19 38 59.97	-0.038
etis (mean)	4.6	2 54 20.884	-0.0009	21 0 3.66	-0.010
etis . . .	5.8	3 19 17.092	+0.0013	24 25 25.65	-0.046
etis . . .	6.1	3 23 28.270	+0.0006	+22 30 42.33	-0.112
iri . . .	5.9	3 29 24.408	+0.0013	24 10 48.45	-0.023
iri . . .	6.1	3 35 41.512	+0.0014	25 3 19.68	-0.008
iri . . .	5.4	3 39 44.837	+0.0009	24 1 22.24	-0.049
iri . . .	3.8	3 39 49.485	+0.0016	23 50 48.77	-0.050
iri . . .	5.6	3 40 5.203	+0.0004	+24 34 24.49	-0.038
iri . . .	4.3	3 40 8.665	+0.0010	24 12 5.59	-0.034
iri . . .	4.1	3 40 45.945	+0.0016	24 6 10.70	-0.044
iri . . .	5.8	3 40 50.424	+0.0012	24 17 23.96	-0.046
iri . . .	6.5	3 40 58.866	+0.0006	24 15 48.72	-0.039
iri . . .	4.3	3 41 16.683	+0.0017	+23 41 3.48	-0.050
iri . . .	3.0	3 42 25.719	+0.0016	23 50 35.18	-0.050
iri . . .	3.7	3 44 6.289	+0.0013	23 47 39.60	-0.048
iri . . .	5.2	3 44 7.575	+0.0009	23 52 40.23	-0.046
iri . . .	5.3	3 45 12.140	+0.0033	25 19 25.88	-0.103
iri . . .	5.6	4 5 39.079	-0.0024	+26 15 35.98	-0.042
iri . . .	5.0	4 15 7.389	-0.0019	27 8 53.74	-0.082
iri . . .	5.3	4 17 24.460	+0.0028	25 25 46.42	-0.029
igæ . . .	6.0	4 47 28.420	+0.0033	27 45 22.23	-0.037
igæ . . .	6.5	4 59 18.940	-0.0001	27 34 41.41	-0.075
igæ . . .	6.0	5 4 24.623	....	+27 55 27.19	...
iri . . .	6.4	5 15 38.965	-0.0027	27 52 19.52	-0.015
igæ . . .	6.4	5 17 59.796	+0.0017	28 51 24.17	-0.031
iri . . .	1.8	5 20 55.053	+0.0025	28 32 12.08	-0.177
igæ . . .	6.5	5 30 35.407	-0.0013	27 36 27.56	-0.076
igæ . . .	5.7	5 31 50.228	-0.0004	+26 52 19.33	-0.039
iri . . .	5.1	5 34 28.117	+0.0018	25 51 1.39	-0.029
iri . . .	5.6	5 45 36.644	-0.0013	27 56 36.54	+0.011
iri . . .	4.6	5 47 59.110	+0.0013	27 35 35.22	-0.020
igæ . . .	6.4	5 51 9.795	....	+28 55 47.19	...

[Eph 13]



MEAN PLACES FOR 1915.0. (January 0^d.732, Washington.)

Name of Star.		Magni- tude.	Right Ascension.	Annual Proper Motion.	Declination.	Annual Proper Motion.
			h m s	s	° ' "	"
139	Tauri . . .	4.7	5 52 43.196	0.0000	+25 56 39.68	-0.00
415 B.	Tauri . . .	6.1	5 55 40.056	+0.0018	27 34 7.97	-0.00
49	Aurigæ . . .	5.1	6 29 50.914	-0.0001	28 5 22.19	-0.00
54	Aurigæ . . .	5.8	6 34 11.539	-0.0012	28 20 20.84	-0.01
ε	Geminorum . . .	3.2	6 38 42.204	-0.0001	25 12 58.74	-0.01
37	Geminorum . . .	5.7	6 50 5.102	-0.0008	+25 28 58.73	+0.04
39	Geminorum . . .	6.2	6 53 33.186	-0.0117	26 11 37.19	+0.04
40	Geminorum . . .	6.3	6 54 13.094	-0.0012	26 1 49.74	-0.01
ω	Geminorum . . .	5.2	6 57 14.119	-0.0003	24 20 15.39	0.00
47	Geminorum . . .	5.6	7 6 6.880	-0.0011	26 59 49.58	-0.01
48	Geminorum . . .	5.8	7 7 16.603	-0.0009	+24 16 18.56	-0.01
52	Geminorum . . .	6.1	7 9 30.151	+0.0038	25 2 1.24	-0.00
134 B.	Geminorum . . .	6.5	7 11 47.598	+0.0058	26 50 36.72	-0.14
A	Geminorum . . .	5.1	7 18 17.674	-0.0051	25 12 53.48	-0.04
58	Geminorum . . .	6.0	7 18 21.745	-0.0022	23 6 34.89	-0.04
	B. D. +23° 1744 . . .	6.4	7 27 45.102	-0.0010	+23 4 10.93	-0.01
176 B.	Geminorum . . .	6.3	7 33 5.963	+0.0038	24 33 4.92	-0.01
181 B.	Geminorum . . .	6.0	7 34 3.977	-0.0006	24 24 56.95	-0.00
187 B.	Geminorum . . .	6.3	7 35 53.347	+0.0011	23 12 58.70	+0.01
192 B.	Geminorum . . .	6.3	7 38 18.574	-0.0014	22 36 2.78	+0.05
κ	Geminorum . . .	3.7	7 39 10.122	-0.0014	+24 36 9.66	-0.00
82	Geminorum . . .	6.3	7 43 28.800	-0.0010	23 21 7.92	-0.01
5 B.	Canceri . . .	6.4	7 55 56.427	-0.0003	23 49 2.87	-0.02
9	Canceri . . .	6.2	8 1 16.255	-0.0009	22 52 44.13	-0.01
μ	Canceri . . .	5.5	8 2 45.884	+0.0019	21 49 44.95	-0.04
35 B.	Canceri . . .	6.4	8 8 39.692	-0.0017	+23 23 39.28	-0.01
49 B.	Canceri . . .	6.0	8 15 23.702	+0.0052	21 0 59.42	-0.00
θ	Canceri . . .	5.5	8 26 45.092	-0.0039	18 22 56.30	-0.00
η	Canceri . . .	5.5	8 27 47.760	-0.0025	20 43 50.34	-0.01
39	Canceri . . .	6.5	8 35 13.207	-0.0027	20 18 30.99	-0.01
40	Canceri . . .	6.5	8 35 18.368	-0.0014	+20 16 20.15	-0.00
102 B.	Canceri . . .	6.5	8 35 29.383	-0.0048	19 58 16.62	-0.00
ε	Canceri . . .	6.3	8 35 34.723	-0.0007	19 50 46.14	-0.01
δ	Canceri . . .	4.2	8 39 51.429	-0.0008	18 28 2.70	-0.00
139 B.	Canceri . . .	6.1	8 45 54.960	-0.0011	19 9 0.84	-0.00
X	Canceri (var.) . . .	6.2	8 50 35.777	+0.0009	+17 33 19.88	+0.01
81	Canceri . . .	6.4	9 7 38.633	-0.0359	15 20 21.28	+0.14
π	Canceri . . .	5.6	9 10 32.464	-0.0022	15 17 41.14	-0.00
227 B.	Canceri . . .	6.4	9 16 34.015	...	15 43 57.20	...
12 B.	Leonis . . .	6.3	9 20 50.247	-0.0042	16 57 10.78	-0.01
7	Leonis . . .	6.2	9 31 14.341	-0.0021	+14 45 34.15	-0.00
11	Leonis . . .	6.5	9 33 23.102	-0.0047	14 43 55.23	-0.01
ψ	Leonis . . .	5.6	9 39 6.288	-0.0002	14 24 39.56	-0.00
18	Leonis . . .	5.8	9 41 48.725	-0.0006	12 12 7.31	+0.00
19	Leonis . . .	6.4	9 42 51.807	-0.0049	11 57 42.79	+0.00
R	Leonis (var.) . . .	5-10	9 42 59.299	-0.0005	+11 49 25.38	-0.0
ν	Leonis . . .	5.0	9 53 39.075	-0.0028	12 51 2.16	-0.0
A	Leonis . . .	4.6	10 3 23.725	-0.0057	10 24 52.59	-0.0
α	Leonis . . .	1.3	10 3 50.825	-0.0169	12 22 59.05	-0.0
43	Leonis . . .	6.3	10 18 33.650	-0.0017	+6 58 28.70	-0.0

STARS OCCULTED BY THE MOON, 1915. 567

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Name of Star.	Magni- tude.	Right Ascension.	Annual Proper Motion.	Declination.	Annual Proper Motion.
		h m s	s	° ' "	"
Leonis . . .	5.9	10 20 46.588	+0.0017	+ 9 13 2.34	-0.041
Leonis . . .	5.8	10 23 9.725	+0.0011	10 11 46.09	-0.003
Leonis . . .	3.8	10 28 20.236	-0.0004	9 44 39.87	-0.003
Leonis . . .	5.2	10 30 22.039	-0.0072	7 23 29.78	+0.046
Leonis . . .	5.7	10 30 34.704	-0.0030	9 5 23.57	-0.010
Sextantis . . .	6.1	10 38 56.282	+0.0018	+ 5 11 38.88	-0.019
Sextantis . . .	6.3	10 41 40.199	-0.0010	6 49 17.09	-0.040
Leonis . . .	6.1	10 51 36.746	-0.0013	6 38 21.56	-0.007
Leonis . . .	5.0	10 56 10.282	+0.0004	4 4 26.68	-0.022
Leonis . . .	5.1	10 56 20.511	-0.0035	6 33 30.35	-0.025
Leonis . . .	5.7	11 2 34.123	-0.0253	+ 2 25 2.26	-0.080
Leonis . . .	5.4	11 12 54.963	+0.0027	2 28 41.39	-0.145
Leonis . . .	6.0	11 14 33.224	-0.0037	2 7 0.05	-0.053
B. Leonis . . .	6.3	11 18 56.827	-0.0024	0 35 55.69	-0.015
Leonis . . .	5.5	11 19 40.636	-0.0013	+ 1 52 28.34	+0.003
B. Leonis . . .	6.3	11 23 33.122	-0.0025	- 1 13 54.86	+0.007
Leonis . . .	4.5	11 32 35.798	0.0000	0 21 15.61	+0.039
B. Leonis . . .	6.2	11 34 3.451	-0.0028	- 1 57 57.29	+0.047
B. Virginis . . .	6.2	11 44 41.206	-0.0148	+ 0 9 13.53	+0.007
B. Virginis . . .	6.5	12 9 54.175	-0.0051	- 5 14 47.80	+0.114
Virginis . . .	5.3	12 29 23.445	-0.0057	- 8 58 59.43	+0.004
Virginis . . .	4.8	12 34 51.448	-0.0056	7 31 40.65	-0.031
B. Virginis . . .	6.0	12 49 53.186	-0.0058	11 11 16.45	-0.037
Virginis . . .	5.0	12 49 55.837	-0.0023	9 4 39.24	-0.028
Virginis . . .	5.2	13 3 26.498	+0.0007	10 17 10.28	-0.014
Virginis . . .	5.7	13 22 13.578	-0.0096	-12 15 56.08	-0.023
Virginis . . .	4.9	13 22 54.986	-0.0086	15 31 59.26	+0.013
Virginis . . .	5.6	13 28 19.008	-0.0050	14 55 33.59	+0.004
Virginis . . .	5.6	13 39 54.474	+0.0007	15 45 7.07	-0.011
Virginis . . .	6.1	13 41 0.318	-0.0029	15 20 26.86	-0.034
Virginis . . .	5.8	13 42 47.717	+0.0025	-17 26 5.08	-0.046
Virginis . . .	5.1	13 45 14.978	-0.0077	17 42 40.10	-0.040
H. Virginis . . .	5.5	14 10 42.863	-0.0031	17 48 16.43	-0.015
G. Virginis . . .	6.4	14 12 21.634	-0.0005	18 11 26.75	+0.106
G. Virginis . . .	5.7	14 13 56.077	-0.0039	18 19 21.05	-0.001
G. Libræ . . .	6.5	14 30 3.617	+0.0032	-20 4 0.51	-0.004
G. Libræ . . .	6.4	14 41 21.414	-0.0047	20 48 58.01	-0.121
G. Libræ . . .	6.1	14 42 23.478	-0.0032	20 58 7.83	-0.014
B. Libræ . . .	5.7	14 52 29.949	+0.0745	21 1 59.68	-1.792
G. Libræ . . .	6.1	15 1 32.740	+0.0065	21 42 6.15	-0.051
G. Libræ . . .	5.8	15 11 27.164	-0.0028	-22 5 7.63	+0.018
B. Libræ . . .	6.3	15 28 7.014	-0.0006	24 12 5.15	-0.042
Libræ . . .	5.0	15 35 15.184	-0.0018	23 32 33.26	-0.027
Scorpii . . .	4.7	15 45 51.777	-0.0023	25 29 37.65	-0.044
Scorpii . . .	4.6	15 48 30.321	-0.0017	25 4 26.39	-0.023
B. Scorpii . . .	5.4	15 48 49.024	-0.0022	-24 16 50.58	-0.037
Scorpii . . .	5.9	15 49 33.082	-0.0031	24 59 32.92	-0.029
Scorpii . . .	5.7	15 50 21.661	-0.0038	26 0 58.02	-0.028
B. Scorpii . . .	5.4	15 53 28.789	-0.0031	24 35 12.58	+0.004
Scorpii . . .	3.0	15 53 42.394	-0.0010	-25 52 13.02	-0.048

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MEAN PLACES FOR 1915.0. (January 0^d.732, Washington.)

Name of Star.		Magni- tude.	Right Ascension.			Annual Proper Motion.	Declination.	Annual Proper Motion.
			h	m	s	s	" ' "	"
48 B.	Scorpii	4.9	15	58	12.251	-0.0048	-25 37 44.86	-0.043
50 B.	Scorpii	6.4	15	58	48.324	+0.0017	24 29 33.62	-0.012
65 B.	Scorpii	5.5	16	2	56.663	+0.0095	26 5 57.87	+0.011
85 B.	Scorpii	6.0	16	9	44.210	-0.0005	25 15 42.79	+0.012
σ	Scorpii	3.1	16	16	1.137	-0.0011	25 23 23.18	-0.029
α	Scorpii	1.2	16	24	11.574	-0.0006	-26 14 39.44	-0.008
116 B.	Scorpii	6.2	16	26	9.715	-0.0013	26 21 12.38	-0.021
τ	Scorpii	2.9	16	30	35.282	-0.0013	28 2 26.34	-0.024
134 B.	Scorpii	6.4	16	39	0.914	+0.0012	27 17 50.71	+0.014
135 B.	Scorpii	6.0	16	39	41.128	-0.0015	28 21 7.72	+0.007
118 B.	Ophiuchi	6.2	17	1	37.973	-0.0008	-26 23 56.53	-0.046
95 G.	Ophiuchi	6.1	17	7	5.690	+0.0008	27 39 28.31	-0.009
36	Ophiuchi (First Star)	5.4	17	10	7.075	-0.0369	26 28 44.84	-1.169
43	Ophiuchi	5.4	17	18	0.520	-0.0002	28 3 41.35	-0.046
136 G.	Ophiuchi	6.3	17	21	39.638	-0.0010	25 52 8.43	-0.003
151 G.	Ophiuchi	6.0	17	26	27.701	+0.0012	-26 12 19.34	-0.008
163 G.	Ophiuchi	6.3	17	37	56.574	+0.0002	27 50 38.49	-0.017
X	Sagittarii (var.)	4.4	17	42	12.582	+0.0002	27 47 57.77	-0.015
4	G. Sagittarii	6.2	17	43	8.864	-0.0003	26 56 44.54	-0.020
10	G. Sagittarii	5.7	17	51	19.815	+0.0024	28 3 7.79	+0.015
210 B.	Scorpii	5.8	17	53	15.577	+0.0028	-28 45 1.31	+0.005
38 B.	Sagittarii	4.7	18	2	41.959	+0.0016	28 28 2.39	-0.009
	C. D. -28° 14268	6.4	18	6	34.010	-0.0002	28 55 14.14	-0.009
48 G.	Sagittarii	6.3	18	12	0.548	+0.0003	28 18 59.99	-0.021
62 B.	Sagittarii	6.0	18	12	1.026	+0.0053	28 40 52.95	+0.021
66 B.	Sagittarii	4.7	18	12	43.953	0.0000	-27 4 26.59	+0.011
67 B.	Sagittarii	6.4	18	13	25.949	-0.0044	25 38 15.19	-0.021
58 G.	Sagittarii	6.1	18	16	37.508	+0.0027	28 28 10.13	+0.005
68 G.	Sagittarii	6.2	18	22	25.822	0.0000	26 41 9.59	-0.046
λ	Sagittarii	2.9	18	22	43.506	-0.0033	25 28 11.22	-0.109
69 G.	Sagittarii	6.3	18	22	48.063	+0.0018	-26 48 32.10	-0.021
86 B.	Sagittarii	6.5	18	23	39.279	-0.0063	26 38 12.43	-0.024
126 B.	Sagittarii	5.7	18	39	36.070	-0.0008	25 5 50.46	-0.001
φ	Sagittarii	3.3	18	40	20.767	+0.0034	27 4 44.82	-0.006
σ	Sagittarii	2.1	18	49	59.674	-0.0003	26 24 12.19	-0.025
162 B.	Sagittarii	6.4	18	53	7.845	-0.0009	-24 59 27.82	-0.009
127 G.	Sagittarii	6.4	18	55	11.873	+0.0023	25 3 40.20	+0.021
172 B.	Sagittarii	5.8	18	57	15.699	+0.0002	24 57 53.42	-0.029
189 B.	Sagittarii	6.1	19	3	3.036	+0.0012	24 47 27.27	+0.001
201 B.	Sagittarii	5.9	19	7	59.605	-0.0015	26 3 1.01	-0.018
ψ	Sagittarii	4.9	19	10	19.768	+0.0025	-25 24 15.01	-0.025
208 B.	Sagittarii	6.1	19	10	22.562	+0.0072	24 19 29.70	-0.028
χ	Sagittarii	4.9	19	20	6.232	+0.0033	24 40 28.22	-0.005
49	Sagittarii	5.5	19	20	21.068	-0.0017	24 7 46.71	+0.001
51	Sagittarii	5.8	19	30	52.107	+0.0004	24 54 21.29	-0.005
h	Sagittarii	4.7	19	31	32.153	+0.0044	-25 4 19.74	-0.017
53	Sagittarii	6.3	19	34	43.086	-0.0004	23 37 18.86	-0.017
274 B.	Sagittarii	6.1	19	35	0.665	+0.0018	23 37 28.20	-0.021
308 B.	Sagittarii	6.3	19	49	12.480	-0.0094	24 9 12.38	-0.438
329 B.	Sagittarii	6.1	19	56	20.929	+0.0010	-22 58 18.13	-0.005

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me of Star.	Magni- tude.	Right Ascension.	Annual Proper Motion.	Declination.	Annual Proper Motion.
		h m s	s	" ' "	"
ttarii . . .	6.5	19 58 42.222	-0.0019	-22 50 4.42	+0.052
ricorni . . .	5.7	20 13 1.838	+0.0012	22 4 23.88	-0.032
ricorni . . .	5.5	20 14 29.455	-0.0002	19 23 4.37	-0.006
ricorni . . .	6.2	20 24 32.221	+0.0003	22 40 26.82	-0.027
ricorni . . .	5.6	20 25 1.648	+0.0011	18 51 54.86	-0.081
ricorni . . .	5.3	20 35 12.769	-0.0018	-18 26 18.57	-0.007
ricorni . . .	6.4	20 44 31.367	-0.0004	18 21 0.09	-0.019
ricorni . . .	5.7	20 49 59.785	-0.0041	18 14 45.08	-0.013
ricorni . . .	5.7	20 52 55.279	+0.0046	16 21 32.46	+0.030
ricorni . . .	6.2	20 54 46.487	-0.0012	19 21 55.85	-0.020
ricorni . . .	6.5	20 56 4.869	-0.0025	-17 51 46.34	-0.002
ricorni . . .	4.2	21 1 10.251	+0.0050	17 34 16.91	-0.066
ricorni . . .	6.1	21 10 21.390	-0.0011	17 41 49.56	. . .
ricorni . . .	5.5	21 11 2.680	+0.0016	15 31 31.19	+0.004
ricorni . . .	5.4	21 13 11.440	+0.0015	18 20 30.87	-0.002
ricorni . . .	6.3	21 13 30.451	+0.0031	-17 49 9.95	+0.006
ricorni . . .	4.3	21 17 30.963	-0.0022	17 11 49.76	+0.003
ricorni . . .	5.1	21 36 55.684	-0.0084	14 25 37.58	-0.302
ricorni . . .	6.0	21 38 26.263	-0.0005	14 47 19.79	+0.024
ricorni . . .	5.8	21 39 22.648	-0.0013	15 8 22.30	-0.002
ricorni . . .	5.5	21 41 57.661	+0.0015	-11 45 30.33	-0.004
ricorni . . .	6.1	21 45 5.513	-0.0009	13 7 10.07	+0.031
ricorni . . .	5.2	21 48 39.795	+0.0204	13 57 9.12	+0.001
tarii . . .	6.5	21 49 3.423	-0.0001	10 42 44.22	+0.006
tarii . . .	5.4	22 6 4.919	+0.0019	11 58 59.89	+0.020
tarii . . .	4.3	22 12 20.960	+0.0073	- 8 12 24.85	-0.019
tarii . . .	6.0	22 12 23.441	-0.0034	9 27 50.21	-0.005
tarii . . .	5.3	22 15 43.650	+0.0008	8 14 54.58	-0.008
tarii . . .	6.0	22 19 4.792	+0.0012	7 37 27.90	+0.033
tarii . . .	6.1	22 26 50.965	+0.0129	6 59 21.95	-0.129
tarii . . .	6.3	22 33 54.478	+0.0010	- 8 20 21.66	+0.012
tarii . . .	6.5	22 38 36.281	+0.0014	8 45 23.33	+0.031
tarii . . .	6.4	22 38 48.012	+0.0015	7 24 29.49	-0.007
tarii . . .	5.8	22 50 46.417	-0.0003	5 26 26.65	+0.009
tarii . . .	6.3	22 52 53.173	-0.0024	5 15 52.47	+0.006
ium . . .	6.2	22 53 52.946	+0.0002	- 2 51 2.51	-0.082
tarii . . .	6.1	22 57 7.809	+0.0007	5 10 6.81	+0.002
tarii . . .	5.5	23 11 11.559	-0.0011	3 57 35.38	+0.003
ium . . .	6.4	23 19 10.310	+0.0043	- 0 10 31.15	+0.038
ium . . .	4.9	23 22 34.509	+0.0056	+ 0 47 24.69	-0.093
ium . . .	6.4	23 22 53.550	+0.0031	+ 0 39 20.27	-0.029
ium . . .	6.4	23 27 35.872	+0.0003	- 1 33 19.28	+0.023
ium . . .	5.9	23 29 46.805	+0.0073	- 1 43 1.31	-0.005
ium . . .	5.7	23 32 3.022	-0.0074	+ 1 37 49.53	+0.057
ium . . .	4.6	23 37 42.538	-0.0092	1 18 43.74	-0.154
ium . . .	5.4	23 42 2.842	-0.0034	+ 3 0 54.75	-0.020
ium . . .	5.6	23 45 6.347	+0.0002	0 36 14.77	-0.033
ium . . .	5.8	23 47 36.720	+0.0009	2 27 28.32	-0.011
ium . . .	6.2	23 48 43.511	+0.0003	+ 1 37 4.94	-0.004

[Eph 15]

ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

JANUARY.

THE STAR'S					AT CONJUNCTION IN R. A.					Limit- ing Pa- allels.
* Name.	Mag.	Red'ns from 1915.0.		Apparent Declina- tion.	Washington Mean Time.	Hour Angle, H	Y	x'	y'	N. S.
		$\Delta \alpha$	$\Delta \delta$							
		s	"	s	d h m	h m				s
37 Geminorum	5.7	+2.22	+4.6	+25 29.1	0 21 28.6	+9 19.1	+1.2719	0.5584	-0.0835	+73+59
39 Geminorum	6.2	2.24	4.3	26 11.7	22 58.6	+10 45.9	+0.3755	0.5580	0.0873	+68-3
40 Geminorum	6.3	2.24	4.3	26 1.9	23 15.9	+11 2.5	+0.5264	0.5580	0.0881	+80+5
47 Geminorum	5.6	2.27	3.6	26 59.9	1 4 25.6	-7 58.8	-1.0043	0.5568	0.1011	-17-65
52 Geminorum	6.1	2.22	3.4	25 2.1	5 54.0	-6 33.4	+0.9604	0.5564	0.1047	+90+28
134 B. Geminorum	6.5	+2.26	+3.2	+26 50.7	6 53.9	-5 35.7	-1.0952	0.5561	-0.1072	-24-63
A Geminorum	5.1	2.23	2.8	25 12.9	9 44.2	-2 51.4	+0.3447	0.5553	0.1142	+65-7
176 B. Geminorum	6.3	2.22	1.9	24 33.1	16 14.0	+3 24.7	+0.2650	0.5531	0.1297	+60-13
181 B. Geminorum	6.0	2.21	1.9	24 25.0	16 39.6	+3 49.3	+0.3550	0.5529	0.1307	+60-9
κ Geminorum	3.7	2.21	1.5	24 36.2	18 58.7	+6 3.5	-0.1549	0.5521	0.1361	+35-35
82 Geminorum	6.3	+2.18	+1.4	+23 21.2	20 49.2	+7 50.2	+0.9314	0.5514	-0.1403	+90+22
5 B. Cancri	6.4	2.18	0.5	23 49.1	2 22.0	-10 48.6	-0.3798	0.5491	0.1527	+23-49
9 Cancri	6.2	2.16	0.3	22 52.7	4 45.1	-8 30.4	+0.2536	0.5481	0.1578	+59-10
μ Cancri	5.5	2.13	+0.3	21 49.8	5 25.3	-7 51.6	+1.2692	0.5478	0.1593	+82+49
35 B. Cancri	6.4	2.16	-0.3	23 23.6	8 4.5	-5 17.9	-0.8328	0.5466	0.1649	-3-67
49 B. Cancri	6.0	+2.10	-0.4	+21 1.0	11 7.1	-2 21.5	+1.1932	0.5452	-0.1712	+90+39
η Cancri	5.5	2.07	1.2	20 43.8	16 45.7	+3 5.7	+0.4984	0.5426	0.1824	+76-7
39 Cancri	6.5	2.05	1.5	20 18.5	20 10.0	+6 23.0	+0.3150	0.5410	0.1888	+62+17
40 Cancri	6.5	2.05	1.6	20 16.3	20 12.3	+6 25.3	+0.3462	0.5410	0.1880	+64+15
102 B. Cancri	6.5	2.05	1.5	19 58.3	20 17.4	+6 30.2	+0.6502	0.5409	0.1891	+90+1
ϵ Cancri	6.3	+2.04	-1.5	+19 50.7	20 19.8	+6 32.5	+0.7755	0.5409	-0.1891	+90+7
139 B. Cancri	6.1	2.00	2.1	19 9.0	3 1 6.3	+11 9.5	+0.5898	0.5387	0.1978	+85-4
227 B. Cancri	6.4	1.86	3.2	15 43.9	15 29.3	+1 4.1	+1.1844	0.5320	0.2213	+90+31
12 B. Leonis	6.3	1.87	3.7	16 57.1	17 31.2	+3 2.1	-0.5503	0.5311	0.2242	+14-68
7 Leonis	6.2	1.80	3.8	14 45.5	22 29.6	+7 50.9	+0.6235	0.5290	0.2311	+85-6
11 Leonis	6.5	+1.80	-3.9	+14 43.9	23 31.4	+8 50.8	+0.4132	0.5286	-0.2325	+68-17
ψ Leonis	5.6	1.77	4.2	14 24.6	4 2 16.7	+11 30.9	+0.1054	0.5275	0.2361	+49-33
ν Leonis	5.0	1.70	4.6	12 51.0	9 19.9	-5 39.4	+0.0492	0.5249	0.2445	+40-37
α Leonis	1.3	1.65	5.1	12 22.9	14 18.8	-0 49.9	-0.6914	0.5232	0.2498	+8-78
44 Leonis	5.9	1.54	5.1	9 13.0	22 38.7	+7 14.5	+0.5054	0.5209	0.2575	+74-16
45 Leonis	5.8	+1.55	-5.4	+10 11.7	23 49.4	+8 23.0	-0.8207	0.5206	-0.2585	+1-80
ρ Leonis	3.8	1.52	5.6	9 44.6	5 2 23.1	+10 51.9	-1.1035	0.5200	0.2606	-11-80
48 Leonis	5.2	1.48	5.0	7 23.4	3 23.5	+11 50.5	+1.1771	0.5198	0.2614	+90+24
49 Leonis	5.7	1.50	5.5	9 5.3	3 29.8	+11 56.6	-0.6207	0.5198	0.2614	-12-78
37 Sextantis	6.3	1.42	5.4	6 49.2	9 0.3	-6 43.1	+0.2911	0.5188	0.2652	+60-28
56 Leonis	6.1	+1.38	-5.8	+6 38.3	13 57.5	-1 55.0	-0.8400	0.5182	-0.2681	0-83
d Leonis	5.0	1.33	5.2	4 4.4	16 13.9	+0 17.2	+1.2124	0.5180	0.2693	+90+25
c Leonis	5.1	1.35	6.0	6 33.4	16 19.0	+0 22.1	-1.3889	0.5180	0.2694	-46-77
75 Leonis	5.4	1.23	5.4	2 28.6	6 0 35.2	+8 23.2	+0.5983	0.5177	0.2727	+81-13
76 Leonis	6.0	1.22	5.4	2 6.9	1 24.3	+9 10.7	+0.7493	0.5178	0.2730	+90-5
79 Leonis	5.5	+1.20	-5.5	+1 52.4	3 57.6	+11 39.3	+0.3008	0.5178	0.2737	+60-28
ν Leonis	4.5	1.11	5.3	-0 21.3	10 23.7	-6 6.4	+0.8359	0.5184	0.2748	+90 0
9 B. Virginis	6.2	1.06	5.9	+0 9.1	16 23.8	-0 17.4	-1.3379	0.5194	0.2751	-38-87
78 B. Virginis	6.5	0.89	5.0	-5 14.9	4 48.7	+11 44.3	+0.8027	0.5227	0.2733	+85-2
χ Virginis	4.8	0.75	5.0	7 31.8	16 54.0	-0 33.4	-0.1407	0.5277	0.2682	+35-51
ψ Virginis	5.0	+0.66	-4.9	-9 4.7	8 0 4.6	+6 23.4	-0.6886	0.5315	-0.2636	+18-72
49 Virginis	5.2	0.58	4.9	10 17.3	6 25.1	-11 28.6	-0.8930	0.5352	0.2584	-2-90
i Virginis	5.7	0.48	4.7	12 16.0	15 4.8	-3 6.2	-1.0824	0.5410	0.2498	-60-90
75 Virginis	5.6	0.43	4.0	14 55.6	17 50.9	-0 25.8	+0.9286	0.5431	0.2466	+75+7
83 Virginis	5.6	0.37	4.0	15 45.2	23 3.5	+4 36.1	+0.4965	0.5470	0.2399	+65-18
85 Virginis	6.1	+0.36	-4.2	-15 20.5	23 32.9	+5 4.5	-0.0369	0.5474	-0.2393	+36-46
43 H. Virginis	5.5	0.20	4.2	17 48.3	12 32.4	-6 23.6	-0.5310	0.5581	0.2193	+8-78
231 G. Virginis	6.4	0.19	4.1	18 11.5	13 14.7	-5 42.9	-0.2956	0.5587	0.2181	+20-61
236 G. Virginis	5.7	0.19	4.1	18 19.4	13 55.1	-5 3.9	-0.3091	0.5593	0.2169	+10-62
9 G. Libræ	6.5	0.10	3.9	20 4.1	20 44.1	+1 30.0	+0.0128	0.5652	0.2042	+34+43
17 G. Libræ	6.4	+0.04	-4.0	-20 49.0	10 1 25.7	+6 1.0	-0.1689	0.5693	-0.1946	+24-54

ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

JANUARY.

THE STAR'S					AT CONJUNCTION IN R. A.					Limiting Par- allels.	
Name.	Mag.	Red'ns from 1915.0.		Apparent Declina- tion.	Washington Mean Time.	Hour Angle, H	Y	x'	y'	N.	S.
		$\Delta\alpha$	$\Delta\delta$								
		s	"	"	d h m	h m				"	"
G. Libræ	6.1	+0.04	4.0	20 58.2	10 1 51.3	+6 25.7	-0.0980	0.5697	-0.1937	+28	-49
B. Libræ	5.7	0.00	4.2	21 2.1	5 59.6	+10 24.6	-0.8158	0.5733	0.1847	-12	-90
G. Libræ	6.1	-0.05	4.2	21 42.2	9 39.2	-10 4.2	-0.8042	0.5765	0.1762	-12	-90
G. Libræ	5.8	0.09	4.4	22 5.2	13 37.0	-6 15.8	-1.0981	0.5799	0.1667	-32	-90
B. Libræ	6.3	-0.17	4.2	24 12.2	20 11.2	+0 2.9	-0.0145	0.5853	0.1499	+27	-45
Libræ	5.0	-0.19	4.5	23 32.6	22 57.9	+2 43.0	-1.0810	0.5875	-0.1424	-34	-90
Scorpii	4.7	0.24	4.3	25 29.7	11 3 3.5	+6 38.6	+0.3156	0.5906	0.1310	+42	-26
Scorpii	4.6	0.25	4.5	25 4.5	4 4.3	+7 37.0	-0.2364	0.5913	0.1281	+13	-58
3. Scorpii	5.4	0.25	4.7	24 16.9	4 11.5	+7 43.9	-1.0467	0.5914	0.1277	-33	-90
Scorpii	5.9	0.26	4.5	24 59.6	4 28.4	+8 0.1	-0.3692	0.5916	0.1269	+6	-67
Scorpii	5.7	-0.26	4.2	26 1.0	4 47.0	+8 17.9	+0.6176	0.5919	-0.1260	+59	-9
Scorpii	5.4	0.26	4.7	24 35.3	5 58.4	+9 26.4	-0.9628	0.5927	0.1226	-27	-90
Scorpii	3.0	0.28	4.4	25 52.3	6 3.6	+9 31.4	+0.3128	0.5927	0.1223	+41	-26
Scorpii	4.9	0.29	4.6	25 37.8	7 46.3	+11 9.9	-0.1340	0.5939	0.1173	+18	-52
Scorpii	5.5	0.31	4.5	26 6.0	9 34.1	-11 6.7	+0.1311	0.5951	0.1120	+31	-36
Scorpii	6.0	-0.32	4.9	25 15.8	12 7.9	-8 39.3	-0.9850	0.5967	-0.1042	-31	-90
Scorpii	3.1	0.34	5.1	25 23.5	14 29.5	-6 23.6	-1.0941	0.5980	0.0970	-39	-90
Scorpii	1.2	0.37	5.0	26 14.7	17 32.8	-3 28.0	-0.5199	0.5997	0.0874	-5	-79
Scorpii	6.2	0.38	5.1	26 21.3	18 16.8	-2 45.9	-0.4740	0.6002	0.0851	-3	-75
Scorpii	2.9	0.41	4.8	28 2.5	19 55.6	-1 11.2	+1.0803	0.6010	0.0799	+62	+24
Scorpii	6.4	-0.42	5.2	27 17.9	23 2.9	+1 48.2	+0.1022	0.6023	-0.0698	+25	-38
Scorpii	6.0	0.43	4.9	28 21.2	23 17.8	+2 2.4	+1.1414	0.6024	0.0690	+62	+31
Ophiuchi	6.2	0.46	5.9	26 24.0	12 7 22.1	+9 46.1	-1.2649	0.6050	0.0423	-61	-72
Ophiuchi	6.1	0.48	5.8	27 39.6	9 22.5	+11 41.3	-0.0819	0.6055	0.0356	+13	-49
Ophiuchi	5.4	0.51	5.9	28 3.8	13 22.0	-8 29.4	+0.2074	0.6061	0.0222	+27	-32
Ophiuchi	6.3	-0.54	6.4	27 50.7	20 39.0	+1 31.1	-0.0818	0.6063	-0.0026	+10	-49
NEW MOON.											
Capricorni	6.0	-0.30	6.4	14 47.4	16 21 50.6	-4 4.0	+0.2536	0.5330	+0.2388	+52	-31
Capricorni	5.8	0.30	6.5	15 8.5	22 17.3	-3 38.2	+0.7253	0.5327	0.2392	+75	-5
Capricorni	6.1	-0.29	6.0	13 7.3	17 1 0.4	-1 0.4	-0.7268	0.5303	+0.2421	+2	-90
Capricorni	5.2	0.27	6.1	13 57.3	2 43.0	+0 38.8	+0.5583	0.5288	0.2438	+70	-15
JUPITER	-1.6	...	...	13 40.5	5 29.4	+3 20.1	+0.9484	0.5174	0.2431	+76	+7
Aquarii	5.4	0.23	5.4	11 59.1	11 11.5	+8 51.3	+0.5973	0.5219	0.2510	+75	-13
Aquarii	6.0	0.22	4.7	9 27.9	14 18.9	+11 52.9	-1.2622	0.5195	0.2533	-33	-90
Aquarii	6.3	-0.15	3.9	8 20.4	18 1 10.2	-1 35.4	+0.3334	0.5120	+0.2594	+60	-27
Aquarii	6.5	0.13	3.8	8 45.5	3 34.8	+0 44.9	+1.4024	0.5104	0.2604	+73	+50
Aquarii	6.4	0.14	3.6	7 24.6	3 40.8	+0 50.7	+0.0002	0.5103	0.2604	+42	-44
Aquarii	5.8	0.11	2.7	5 26.5	9 53.1	+6 52.0	-0.4660	0.5067	0.2624	+19	-71
Aquarii	6.3	0.10	2.6	5 15.9	10 59.3	+7 56.3	-0.3638	0.5061	0.2627	+24	-64
Aquarii	6.1	-0.09	2.4	5 10.2	13 12.8	+10 6.0	+0.1188	0.5049	+0.2632	+49	-38
Aquarii	5.5	-0.04	1.7	3 57.6	20 39.1	-6 40.6	+0.7929	0.5014	0.2643	+86	-3
Piscium	6.4	+0.02	0.5	1 33.3	19 5 26.7	+1 52.0	+0.5426	0.4979	0.2642	+77	-16
Piscium	5.9	0.03	-0.4	1 43.0	6 37.3	+3 0.6	+1.0279	0.4975	0.2640	+88	+11
Piscium	4.6	0.04	+0.7	1 18.7	10 54.9	+7 11.0	-1.0999	0.4962	0.2635	-16	-89
Piscium	5.6	+0.08	+0.7	0 36.3	14 56.3	+11 5.7	+0.7216	0.4953	+0.2627	+90	-7
Piscium	5.8	0.08	1.4	2 27.5	16 18.2	-11 34.7	-0.9218	0.4949	0.2623	-5	-88
Piscium	6.2	0.09	1.2	1 37.1	16 54.7	-10 59.2	+0.1447	0.4948	0.2622	+52	-36
Piscium	5.6	0.25	4.0	6 29.2	20 14 27.6	+9 58.0	+0.4234	0.4927	0.2530	+68	-21
Piscium	6.5	0.28	5.1	8 53.6	19 17.5	-9 20.1	-0.9883	0.4929	0.2500	-9	-81
Piscium	3.7	+0.53	+8.5	14 54.6	21 22 33.6	-6 49.7	-1.0733	0.4982	+0.2271	-16	-75
Piscium	6.2	0.56	8.4	14 13.8	22 0 51.7	-4 35.5	-0.1966	0.4990	0.2247	+55	-29
Piscium	6.1	0.57	9.1	15 58.7	2 55.6	-2 35.1	-1.2694	0.4997	0.2224	-34	-74
Arietis	5.8	0.62	9.5	16 32.1	7 26.0	+1 47.5	-0.8948	0.5014	0.2173	-5	-73
Arietis	5.1	0.68	10.0	17 24.3	12 15.3	+6 28.5	-0.8223	0.5033	0.2116	-1	-73
3. Arietis	6.4	+0.71	+10.3	17 50.9	15 34.8	+9 42.2	-0.6149	0.5048	+0.2074	+11	-70

ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

JANUARY.

THE STAR'S					AT CONJUNCTION IN R. A.					Limit- ing Pa- rallels.
Name.	Mag.	Red'ns from 1915.0.		Apparent Declina- tion.	Washington Mean Time.	Hour Angle, H	Y	x'	y'	N. S.
		$\Delta\alpha$	$\Delta\delta$							
		s	"	'	d h m	h m				
47 B. Arietis	6.5	+0.74	+10.2	+17 37.7	22 17 41.6	+11 45.3	+0.0639	0.5058	+0.2047	+48-33
20 H ¹ . Arietis	6.4	0.76	10.0	16 49.7	18 32.1	-11 25.7	+1.1192	0.5062	0.2036	+90-17
15 Arietis	5.9	0.75	10.8	19 6.2	19 9.4	-10 49.5	-1.2686	0.5065	0.2027	-30-71
8 Arietis	5.6	0.80	11.0	19 30.7	23 1.8	-7 3.0	-0.9464	0.5083	0.1975	-9-70
26 Arietis	6.2	0.88	11.2	19 28.9	23 5 25.2	-0 52.0	+0.3194	0.5116	0.1882	+63-18
r Arietis	5.4	+0.94	+12.0	+21 35.9	9 32.1	+3 7.5	-1.2611	0.5138	+0.1820	-38-68
μ Arietis	5.7	0.96	11.3	19 39.2	11 20.4	+4 52.5	+1.2176	0.5148	0.1792	+90-39
e Arietis (mean)	4.6	1.08	11.9	21 0.3	19 41.9	-11 1.5	+1.1626	0.5106	0.1654	+90-36
64 Arietis	5.8	1.25	12.9	24 25.6	7 50.8	+0 44.5	-0.7480	0.5268	0.1434	+2-65
7 Tauri	5.9	1.32	12.7	24 11.0	12 41.0	+5 25.4	+0.1928	0.5298	0.1340	+55-18
11 Tauri	6.1	+1.37	+13.0	+25 3.5	15 39.7	+8 18.3	-0.3847	0.5315	+0.1280	-22-47
16 Tauri	5.4	1.39	12.5	24 1.6	17 34.4	+10 9.2	+0.9975	0.5327	0.1241	+90-18
17 Tauri	3.8	1.39	12.5	23 51.0	17 36.6	+10 11.4	+1.1065	0.5327	0.1240	+90-15
18 Tauri	5.6	1.40	12.7	24 34.6	17 44.0	+10 18.5	+0.4088	0.5328	0.1238	+70-5
q Tauri	4.3	1.40	12.6	24 12.3	17 45.6	+10 20.0	+0.8231	0.5328	0.1237	+90-17
20 Tauri	4.1	+1.40	+12.6	+24 6.4	18 3.2	+10 37.1	+0.9681	0.5330	+0.1231	+90-16
21 Tauri	5.8	1.40	12.6	24 17.6	18 5.3	+10 39.1	+0.7658	0.5330	0.1231	+90-14
22 Tauri	6.5	1.40	12.6	24 16.0	18 9.2	+10 42.9	+0.8031	0.5330	0.1229	+90-16
14 H. Tauri	5.3	1.44	12.9	25 19.6	20 8.0	-11 22.2	-0.1294	0.5342	0.1188	+30-32
p Tauri	5.6	1.58	12.8	26 15.8	25 5 36.2	-2 12.9	-0.1336	0.5397	0.0983	+30-31
ϕ Tauri	5.0	+1.65	+12.8	+27 9.1	9 55.7	+1 57.8	-0.7084	0.5421	+0.0885	+3-63
χ Tauri	5.3	1.66	12.2	25 26.0	10 58.0	+2 58.1	+1.2757	0.5426	0.0861	+72-59
17 B. Aurigæ	6.0	1.87	11.9	27 45.6	10 26.9	-8 0.9	-0.3395	0.5493	0.0537	+24-38
38 B. Aurigæ	6.5	1.94	11.4	27 34.9	5 40.8	-2 58.0	+0.1033	0.5515	0.0406	+59-13
47 B. Aurigæ	6.0	1.98	11.3	27 55.6	7 55.1	-0 48.4	-0.1911	0.5524	0.0350	+33-28
354 B. Tauri	6.4	+2.04	+10.8	+27 52.5	12 50.0	+3 56.0	+0.0074	0.5542	+0.0224	+44-10
22 Aurigæ	6.4	2.08	10.9	28 51.6	13 51.4	+4 55.3	-1.0476	0.5545	0.0197	-22-61
β Tauri	1.8	2.00	10.7	28 32.4	15 7.7	+6 8.8	-0.6744	0.5549	0.0164	+5-57
107 B. Aurigæ	6.5	2.13	10.0	27 36.6	19 19.7	+10 11.9	+0.3865	0.5562	0.0055	+90-57
112 B. Aurigæ	5.7	2.12	9.8	26 52.5	19 52.1	+10 43.1	+1.1917	0.5563	+0.0040	+86-55
406 B. Tauri	5.6	+2.21	+9.3	+27 56.8	27 1 49.1	+7 32.6	+0.0001	0.5577	-0.0117	+44-15
136 Tauri	4.6	2.22	9.1	27 35.7	2 50.5	-6 33.4	+0.3681	0.5579	0.0144	+68-3
154 B. Aurigæ	6.4	2.26	9.2	28 55.9	4 12.7	-5 14.2	-1.1082	0.5581	0.0181	-28-61
415 B. Tauri	6.1	2.26	8.7	27 34.3	6 9.0	-3 22.1	-0.3320	0.5584	0.0232	+65-1
49 Aurigæ	5.1	2.42	6.8	28 5.5	20 49.5	+10 46.6	-0.8576	0.5594	0.0622	-7-62
54 Aurigæ	5.8	+2.44	+6.5	+28 20.5	22 41.4	-11 25.5	-1.2460	0.5594	-0.0671	-47-62
39 Geminorum	6.2	2.46	4.9	26 11.7	7 0.7	-3 24.3	+0.4182	0.5587	0.0889	+71-1
40 Geminorum	6.3	2.46	4.8	26 1.9	7 17.8	-3 7.8	+0.5682	0.5586	0.0896	+84-7
47 Geminorum	5.6	2.52	4.2	26 59.9	12 25.7	+1 49.0	-0.9634	0.5579	0.1027	-14-63
52 Geminorum	6.1	2.49	3.7	25 2.1	13 53.6	+3 13.9	+0.9906	0.5576	0.1064	+90-30
134 B. Geminorum	6.5	+2.54	+3.7	+26 50.7	14 53.0	+4 11.1	-1.0573	0.5574	-0.1089	-31-63
A Geminorum	5.1	2.52	3.1	25 12.9	17 42.0	+6 54.1	+0.3721	0.5568	0.1159	+67-6
176 B. Geminorum	6.3	2.54	2.0	24 33.1	0 8.5	-10 53.1	+0.2835	0.5552	0.1316	+61-12
181 B. Geminorum	6.0	2.54	1.9	24 25.0	0 33.9	-10 58.6	+0.3725	0.5551	0.1326	+67-8
κ Geimnorum	3.7	2.55	1.6	24 36.2	2 51.7	-8 15.7	-0.1378	0.5544	0.1381	+30-34
82 Geminorum	6.3	+2.53	+1.1	+23 21.2	4 41.1	-6 30.1	+0.9396	0.5538	-0.1423	+90-23
5 B. Cancri	6.4	2.56	+0.3	23 49.1	10 10.2	-1 12.6	-0.3716	0.5520	0.1549	+23-48
9 Cancri	6.2	2.55	-0.2	22 52.7	12 31.7	+1 4.0	+0.2543	0.5512	0.1602	+59-17
μ Cancri	5.5	2.52	0.4	21 49.7	13 11.4	+1 42.3	+1.2624	0.5510	0.1616	+83-48
35 B. Cancri	6.4	2.57	0.7	23 23.6	15 48.6	+4 14.0	-0.8295	0.5500	0.1674	-3-67
49 B. Cancri	6.0	+2.52	-1.3	+21 1.0	18 47.8	+7 7.9	+1.1785	0.5489	-0.1738	+90-37
η Cancri	5.5	2.52	2.2	20 43.8	0 22.6	-11 29.7	+0.4803	0.5467	0.1851	+74-6
39 Cancri	6.5	2.52	2.7	20 18.5	3 43.8	-8 15.5	+0.2935	0.5453	0.1917	+61-18
40 Cancri	6.5	2.52	2.7	20 16.3	3 40.1	-8 13.2	+0.3243	0.5453	0.1918	+63-16
102 B. Cancri	6.5	2.51	2.7	19 58.2	3 51.1	-8 8.4	+0.6260	0.5452	0.1920	+87-1
e Cancri	6.3	+2.51	-2.7	+19 50.7	3 53.5	-8 6.1	+0.7502	0.5452	-0.1920	+90-6

ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

JANUARY.

THE STAR'S					AT CONJUNCTION IN R. A.					Limiting Parallels.	
Name.	Mag.	Red'n's from 1915.0.		Apparent Declination.	Washington Mean Time.	Hour Angle, <i>H</i>	<i>Y</i>	<i>x'</i>	<i>y'</i>	N.	S.
		$\Delta\alpha$	$\Delta\delta$		d h m	h m					
139 B. Cancri	6.1	+2.49	-3.5	+19 9.0	30 8 35.5	-3 33.7	+0.5591	0.5433	-0.2009	+81	-5
227 B. Cancri	6.4	2.41	5.5	15 43.9	22 43.5	+10 6.0	+1.1288	0.5375	0.2249	+90	+26
12 B. Leonis	6.3	2.43	5.8	16 57.1	81 0 43.1	-11 58.4	-0.5996	0.5367	0.2279	+12	-70
7 Leonis	6.2	2.38	6.4	14 45.5	5 35.8	-7 15.3	+0.5033	0.5348	0.2349	+80	-9
11 Leonis	6.5	2.38	6.6	14 43.8	6 36.4	-6 16.6	+0.3537	0.5344	0.2363	+64	-20
ψ Leonis	5.6	+2.37	-6.9	+14 24.5	9 18.5	-3 39.8	+0.0450	0.5334	-0.2400	+46	-36
ν Leonis	5.0	2.32	7.7	12 50.9	16 13.2	+3 1.5	-0.0194	0.5310	0.2485	+43	-41
<i>A</i> Leonis	4.6	2.26	8.1	10 24.7	20 53.0	+7 32.3	+1.3389	0.5295	0.2537	+83	+43
α Leonis	1.3	+2.29	-8.3	+12 22.8	21 6.1	+7 45.0	-0.7593	0.5294	-0.2540	+4	-78

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44 Leonis	5.9	+2.20	-8.9	+9 12.9	1 5 15.6	-8 21.0	+0.4174	0.5272	-0.2618	+68	-20
45 Leonis	5.8	2.21	9.2	10 11.6	6 24.9	-7 13.9	-0.8983	0.5269	0.2628	-4	-80
ρ Leonis	3.8	2.20	9.4	9 44.5	8 55.5	-4 48.1	-1.0922	0.5264	0.2648	-16	-80
48 Leonis	5.2	+2.16	-9.2	+7 23.3	9 54.6	-3 50.9	+1.0782	0.5261	-0.2656	+90	+16
49 Leonis	5.7	2.18	9.4	9 5.2	10 0.8	-3 44.9	-0.7040	0.5261	0.2656	+7	-80
37 Sextantis	6.3	2.12	9.8	6 49.1	15 24.6	+1 28.7	+0.1942	0.5251	0.2694	+54	-33
56 Leonis	6.1	2.09	10.1	6 38.2	20 15.8	+6 10.8	-0.9321	0.5244	0.2723	-6	-83
<i>d</i> Leonis	5.0	2.04	9.9	4 4.3	22 29.5	+8 20.3	+1.1012	0.5241	0.2734	+90	+17
75 Leonis	5.4	+1.97	-10.4	+2 28.5	2 64.1	-7 43.3	+0.4855	0.5235	-0.2766	+73	-19
76 Leonis	6.0	1.96	10.4	2 6.8	7 29.4	-6 56.8	+0.6347	0.5235	0.2768	+84	-11
79 Leonis	5.5	1.95	10.5	+1 52.3	9 59.9	-4 31.0	+0.1876	0.5235	0.2774	+54	-34
<i>v</i> Leonis	4.5	1.88	10.6	-0 21.4	16 19.3	+1 36.6	+0.7147	0.5237	0.2784	+90	-7
78 B. Virginis	6.5	1.71	10.6	5 15.0	3 10 28.2	-4 48.8	+0.6737	0.5267	0.2759	+84	-9
χ Virginis	4.8	+1.60	-10.7	-7 31.9	22 26.0	+6 46.0	-0.2694	0.5305	-0.2700	+29	-59
ψ Virginis	5.0	1.52	10.6	9 4.8	4 53.6	-10 20.4	-0.5980	0.5335	0.2648	+11	-82
49 Virginis	5.2	1.46	10.5	10 17.3	11 52.4	-4 14.1	-1.0230	0.5305	0.2592	-14	-90
<i>i</i> Virginis	5.7	1.38	10.3	12 16.1	20 31.3	+4 7.6	-1.2134	0.5413	0.2499	-30	-90
75 Virginis	5.6	1.34	9.5	14 55.7	23 17.4	+6 48.0	+0.8005	0.5428	0.2465	+75	-1
83 Virginis	5.6	+1.30	-9.4	-15 45.3	5 43.0	+11 50.7	+0.3692	0.5462	-0.2395	+58	-25
85 Virginis	6.1	1.29	9.5	15 20.6	5 0.3	-11 40.8	-0.1655	0.5465	0.2388	+29	-53
43 H. Virginis	5.5	1.15	9.1	17 48.4	18 4.8	+0 56.2	-0.6579	0.5554	0.2180	+1	-90
231 G. Virginis	6.4	1.14	9.0	18 11.6	18 47.5	+1 37.3	-0.4212	0.5559	0.2168	+14	-69
236 G. Virginis	5.7	1.14	9.0	18 19.5	19 28.3	+2 16.6	-0.4345	0.5564	0.2155	+13	-71
9 G. Libræ	6.5	+1.06	-8.5	-20 4.2	6 21.9	+8 55.2	-0.1070	0.5614	-0.2025	+28	-50
17 G. Libræ	6.4	1.01	8.4	20 40.1	7 7.2	-10 30.0	-0.2885	0.5649	0.1927	+18	-61
18 G. Libræ	6.1	1.01	8.3	20 58.3	7 33.1	-10 5.1	-0.2160	0.5652	0.1918	+21	-57
43 B. Libræ	5.7	0.97	8.6	21 2.1	11 45.2	-6 2.4	-0.9381	0.5683	0.1826	-10	-90
47 G. Libræ	6.1	0.92	8.2	21 42.2	15 28.5	+2 27.6	-0.9249	0.5710	0.1741	-19	-90
64 G. Libræ	5.8	+0.87	-8.2	-22 5.3	19 30.7	+1 25.4	-1.2195	0.5738	-0.1644	+44	-89
153 B. Libræ	6.3	0.80	7.5	24 12.2	2 12.7	+7 51.9	-0.1210	0.5784	0.1475	+21	-51
42 Libræ	5.0	0.77	7.8	23 32.7	5 3.0	+10 35.4	-1.1976	0.5803	0.1401	+44	-90
<i>b</i> Scorpii	4.7	0.72	7.1	25 29.7	9 14.2	-9 23.3	+0.2165	0.5830	0.1287	+37	-32
<i>A</i> Scorpii	4.6	0.71	7.3	25 4.6	10 16.4	-8 23.5	-0.3408	0.5836	0.1258	+8	-65
31 B. Scorpii	5.4	+0.71	-7.6	-24 17.0	10 23.8	-8 16.4	-1.1590	0.5836	-0.1254	+42	-90
3 Scorpii	5.9	0.71	7.3	24 59.7	10 41.0	-7 59.9	-0.4748	0.5838	0.1247	+1	-75
4 Scorpii	5.7	0.70	7.0	26 1.1	11 0.1	-7 41.6	+0.5231	0.5840	0.1237	+54	-15
40 B. Scorpii	5.4	0.69	7.5	24 35.3	12 13.2	-6 31.4	-1.0740	0.5848	0.1203	-35	-90
π Scorpii	3.0	0.69	7.0	25 52.3	12 18.5	-6 26.3	+0.2159	0.5848	0.1201	+36	-32
48 B. Scorpii	4.9	+0.67	-7.1	-25 37.9	14 3.7	-4 45.3	-0.2347	0.5858	-0.1151	+12	-58
65 B. Scorpii	5.5	0.65	7.0	26 6.1	15 54.2	-2 59.3	+0.0348	0.5868	0.1098	+25	-42
85 B. Scorpii	6.0	0.62	7.3	25 15.8	18 31.9	-0 27.9	-1.0925	0.5882	0.1021	-38	-90
δ Scorpii	3.1	0.60	7.3	25 23.5	20 57.2	+1 51.5	-1.2015	0.5894	0.0949	+48	-87
α Scorpii	1.2	0.56	7.0	26 14.8	8 0.5	+4 52.0	-0.6181	0.5908	0.0854	+10	-90
216 B. Scorpii	6.2	+0.56	-7.0	-26 21.3	0 50.5	+5 35.3	-0.5710	0.5911	-0.0831	+8	-84

ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

FEBRUARY.

THE STAR'S					AT CONJUNCTION IN R. A.						Limit- ing Pe- riod
Name.	Mag.	Red'n's from 1915.0.		Apparent Declina- tion.	Washington Mean Time.	Hour Angle, H	Y	x'	y'	N. S.	
		$\Delta\alpha$	$\Delta\delta$		d h m	h m					
r Scorpii	2.9	+0.54	6.4	-28 2.5	8 2 31.0	+7 12.6	+1.0037	0.5918	-0.0779	+64+17	
134 B. Scorpii	6.4	0.50	6.8	27 18.0	5 44.5	+10 17.3	+0.0159	0.5930	0.0680	+21-43	
135 B. Scorpii	6.0	0.50	6.4	28 21.2	5 59.7	+10 31.9	+1.0685	0.5931	0.0672	+62+23	
95 G. Ophiuchi	6.1	0.40	6.6	27 39.6	16 21.7	-3 31.8	-0.1623	0.5957	0.0343	+9-54	
43 Ophiuchi	5.4	0.36	6.5	28 3.8	20 28.3	+0 24.6	+0.1341	0.5962	-0.0210	+23-36	
163 G. Ophiuchi	6.3	+0.20	6.6	27 50.8	3 58.2	+7 35.8	-0.1530	0.5963	+0.0034	+7-53	
X Sagittarii (var.)	4.4	0.28	6.6	27 48.1	5 34.6	+9 8.1	-0.1889	0.5962	0.0086	+5-55	
4 G. Sagittarii	6.2	0.27	6.8	26 56.9	5 55.8	+9 28.4	-1.0538	0.5962	0.0097	+43-39	
10 G. Sagittarii	5.7	0.25	6.5	28 3.2	9 0.8	-11 34.2	+0.1169	0.5958	0.0197	+22-37	
210 B. Scorpii	5.8	0.24	6.4	28 45.1	9 44.5	-10 52.4	+0.8426	0.5957	0.0220	+61+6	
38 B. Sagittarii	4.7	+0.21	6.4	-28 28.1	13 18.5	-7 27.2	+0.6540	0.5950	+0.0335	+5-6	
C. D. -28° 14268	6.4	0.20	6.3	28 55.3	14 40.3	-6 3.1	+1.1682	0.5946	0.0382	+61+34	
48 G. Sagittarii	6.3	0.18	6.5	28 19.1	16 50.2	-4 4.2	+0.6390	0.5941	0.0447	+5-7	
62 B. Sagittarii	6.0	0.18	6.3	28 41.0	16 50.3	-4 4.1	+1.0107	0.5941	0.0447	+61+28	
66 B. Sagittarii	4.7	0.18	6.8	27 4.6	17 6.6	-3 48.5	-0.6145	0.5940	0.0456	-14-39	
58 G. Sagittarii	6.1	+0.17	6.4	-28 28.3	18 35.4	-2 23.3	+0.8783	0.5935	+0.0503	+61+8	
68 G. Sagittarii	6.2	0.15	6.8	26 41.3	20 48.0	-0 16.2	-0.8207	0.5927	0.0572	-24-39	
69 G. Sagittarii	6.3	0.15	6.8	26 48.6	20 56.5	-0 8.1	-0.6873	0.5927	0.0577	-17-39	
86 B. Sagittarii	6.5	0.15	6.8	26 38.3	21 16.1	-0 10.7	-0.8439	0.5926	0.0587	-25-39	
φ Sagittarii	3.3	0.10	6.6	27 4.9	10 3 40.1	+6 19.2	-0.0458	0.5898	0.0784	+23-36	
σ Sagittarii	2.1	+0.08	6.8	-26 24.3	7 23.9	+9 53.9	-0.3311	0.5879	+0.0895	+5-54	
201 B. Sagittarii	5.9	0.04	6.8	26 3.1	14 25.9	-7 20.9	+0.0094	0.5838	0.1099	+24-39	
ψ Sagittarii	4.9	0.03	6.9	25 24.4	15 21.2	-6 27.8	-0.5406	0.5833	0.1125	-4-39	
χ Sagittarii	4.9	+0.01	7.0	24 40.6	19 13.6	-2 44.5	-0.8410	0.5807	0.1232	-13-39	
51 Sagittarii	5.8	0.00	6.8	24 54.5	23 32.1	+1 23.9	-0.0486	0.5776	0.1347	+24-39	
h Sagittarii	4.7	-0.01	6.8	-25 4.4	23 48.2	+1 39.4	+0.1582	0.5774	+0.1354	+34-35	
53 Sagittarii	6.3	0.02	7.0	23 37.7	11 1 5.2	-2 53.4	-1.1536	0.5765	0.1387	-7-39	
274 B. Sagittarii	6.1	0.02	7.0	23 37.6	1 12.4	+3 0.3	-1.1348	0.5764	0.1390	-3-39	
308 B. Sagittarii	6.3	0.04	6.8	24 9.3	6 59.4	+8 34.0	-0.2539	0.5719	0.1535	+41-39	
329 B. Sagittarii	6.1	0.05	6.9	22 58.4	9 56.1	+11 24.1	-0.4989	0.5696	0.1605	+7-39	
336 B. Sagittarii	6.5	-0.06	6.9	-22 50.2	10 54.7	-11 39.5	-0.4822	0.5688	+0.1628	+5-39	
NEW MOON.											
13 Piscium	6.4	-0.09	1.5	-1 33.3	15 14 42.1	-11 4.6	+0.5014	0.5014	+0.2665	+82+44	
14 Piscium	5.9	0.09	1.5	-1 43.0	15 52.1	-9 56.6	+1.0761	0.5011	0.2663	+82+44	
λ Piscium	4.6	-0.10	0.8	+1 18.7	20 7.2	-5 48.7	-1.0449	0.5000	+0.2658	-13-39	
21 Piscium	5.6	0.07	0.5	0 36.2	16 0 6.1	-1 56.6	+0.7734	0.4991	0.2650	+92+44	
22 Piscium	5.8	0.08	0.1	2 27.5	1 27.2	-0 37.8	-0.8649	0.4988	0.2647	-1-39	
25 Piscium	6.2	-0.07	-0.2	1 37.1	2 3.2	-0 2.8	+0.1088	0.4987	0.2646	+55-39	
51 Piscium	5.6	+0.02	2.3	6 29.2	23 21.2	-3 20.6	+0.4821	0.4968	0.2553	+72-39	
136 B. Piscium	6.5	+0.03	3.2	8 53.5	17 4 7.5	+1 17.8	-0.9237	0.4970	+0.2522	-5-39	
7 Piscium	3.7	0.20	6.5	14 54.6	18 7 5.3	+3 29.9	-1.0079	0.5015	0.2286	-21-39	
101 Piscium	6.2	0.23	6.5	14 13.7	9 22.0	+5 42.6	+0.2579	0.5022	0.2261	+34-39	
105 Piscium	6.1	0.24	7.1	15 58.6	11 24.7	+7 41.8	-1.2046	0.5028	0.2238	-27-39	
4 Arietis	5.8	0.28	7.6	16 32.1	15 52.7	-11 58.0	-0.8311	0.5042	0.2185	-6-39	
ι Arietis	5.1	+0.32	8.1	+17 24.3	20 39.7	-7 19.3	-0.7595	0.5059	+0.2126	+31-39	
35 B. Arietis	6.4	0.35	8.4	17 50.9	23 57.6	-4 7.3	-0.5532	0.5072	0.2083	+14-39	
47 B. Arietis	6.5	0.38	8.4	17 37.6	19 2 3.6	-2 4.9	+0.1238	0.5080	0.2055	+51-39	
20 H. Arietis	6.4	0.39	8.2	16 49.7	2 53.7	-1 16.2	+1.1767	0.5083	0.2043	+102+44	
15 Arietis	5.9	0.38	9.0	19 6.1	3 30.8	-0 40.2	-1.2063	0.5086	0.2035	-27-39	
θ Arietis	5.6	+0.43	9.2	+19 30.7	7 21.8	+3 3.9	-0.8856	0.5102	+0.1981	-5-39	
26 Arietis	6.2	0.50	9.5	19 28.9	13 43.3	+9 14.0	+0.3767	0.5130	0.1886	+66-39	
ν Arietis	5.4	0.54	10.4	21 35.8	17 49.2	-10 47.6	-1.2029	0.5149	0.1822	-31-39	
μ Arietis	5.7	0.58	9.8	19 39.2	19 37.1	-9 3.0	+1.2729	0.5158	0.1793	+82+44	
8 Arietis (mean)	4.6	0.68	10.5	21 0.2	20 3 57.6	-0 57.9	+1.2166	0.5198	0.1653	+102+44	
64 Arietis	5.8	+0.84	+11.8	+24 25.6	16 6.6	+10 48.1	-0.6974	0.5260	+0.1430	+5-39	

ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

FEBRUARY.

THE STAR'S				AT CONJUNCTION IN R. A.							Limiting Parallels.	
Mag.	Red'n's from 1915.0.		Apparent Declination.	Washington Mean Time.	Hour Angle, <i>H</i>	<i>Y</i>	<i>x'</i>	<i>y'</i>	<i>N.</i>	<i>S.</i>		
	$\Delta\alpha$	$\Delta\delta$										
	<i>s</i>	<i>"</i>	<i>°</i>	<i>d</i>	<i>h</i>	<i>m</i>	<i>h</i>	<i>m</i>	<i>°</i>	<i>'</i>		
5.9	+0.92	+11.8	+24 11.0	20	20	57.5	-8 30.3	+0.2426	0.5286	+0.1335	+58-15	
6.1	0.96	12.1	25 3.5	23	56.8	-5 36.8	-0.3364	0.5301	0.1274	+25-44		
5.4	0.99	11.7	24 1.6	21	1	51.9	-3 45.5	+1.0468	0.5311	0.1235	+90+32	
3.8	0.99	11.6	23 51.0	1	54.1	-3 43.3	+1.2460	0.5311	0.1234	+83+50		
5.6	0.99	11.9	24 34.6	2	1.5	-3 36.2	+0.4573	0.5312	0.1231	+74-3		
4.3	+0.99	+11.8	+24 12.3	2	3.1	-3 34.7	+0.8721	0.5312	+0.1231	+90+20		
4.1	0.99	11.7	24 6.4	2	20.7	-3 17.6	+1.0173	0.5314	0.1225	+90+29		
5.8	1.00	11.8	24 17.6	2	22.8	-3 15.6	+0.8146	0.5314	0.1224	+90+17		
6.5	1.00	11.8	24 16.0	2	26.8	-3 11.7	+0.8520	0.5314	0.1223	+90+19		
5.3	1.03	12.2	25 19.6	4	26.0	-1 16.4	-0.0822	0.5325	0.1182	+39-30		
5.6	+1.18	+12.3	+26 15.8	13	57.2	+7 55.9	-0.0895	0.5372	+0.0975	+39-28		
5.0	1.25	12.5	27 9.1	18	18.5	-11 51.5	-0.6671	0.5393	0.0877	+6-60		
6.0	1.50	12.1	27 45.6	22	8 56.8	+2 16.9	-0.3022	0.5456	0.0531	+27-36		
6.5	1.58	11.7	27 34.9	14	13.6	+7 22.7	+0.1401	0.5476	0.0401	+52-11		
6.0	1.62	11.6	27 55.6	16	29.2	+9 33.6	-0.1559	0.5484	0.0345	+35-25		
6.4	+1.70	+11.2	+27 52.5	21	27.1	-9 39.0	+0.0415	0.5500	+0.0219	+46-14		
6.4	1.73	11.5	28 51.6	22	29.2	-8 39.0	-1.0170	0.5503	0.0193	-19-61		
1.8	1.75	11.2	28 32.4	23	46.3	-7 24.6	-0.6430	0.5507	0.0160	+7-55		
6.5	1.80	10.6	27 36.6	23	4	0.9	-3 19.0	+0.4198	0.5518	0.0051	+71+7	
5.7	1.80	10.3	26 52.5	4	33.7	-2 47.4	+1.2273	0.5519	+0.0037	+80+58		
5.6	+1.91	+10.0	+27 56.8	10	34.6	+3 0.7	+0.0301	0.5532	-0.0119	+46-14		
4.6	1.92	9.9	27 35.8	11	36.7	+4 0.6	+0.3089	0.5534	0.0146	+70+5		
6.4	1.96	10.1	28 56.0	12	59.7	+5 20.6	-1.0824	0.5537	0.0182	-25-61		
6.1	1.97	9.5	27 34.3	14	57.3	+7 14.1	+0.3616	0.5540	0.0233	+67+2		
5.1	2.20	7.9	28 5.5	24	5 47.2	-2 27.7	-0.8356	0.5551	0.0620	-5-62		
5.8	+2.23	+7.7	+28 20.5	7	40.2	-0 38.7	-1.2263	0.5551	-0.0669	-42-62		
6.2	2.29	5.9	26 11.7	16	4.3	+7 27.3	+0.4403	0.5547	0.0885	+72 0		
6.3	2.30	5.8	26 1.9	16	21.7	+7 44.1	+0.5905	0.5547	0.0892	+86+8		
5.6	2.38	5.4	26 59.9	21	32.2	-11 16.5	-0.9452	0.5541	0.1023	-12-63		
6.1	2.36	4.6	25 2.1	23	0.8	-9 50.9	+1.0116	0.5539	0.1060	+90+32		
6.5	+2.41	+4.9	+26 50.7	25	0 7	-8 53.2	-1.0397	0.5538	-0.1084	-19-63		
5.1	2.40	4.0	25 13.0	2	51.0	-6 8.9	+0.3910	0.5534	0.1155	+69-5		
6.3	2.45	2.9	24 33.1	9	20.1	+0 6.4	+0.3006	0.5522	0.1312	+62-11		
6.0	2.46	2.8	24 25.0	9	45.5	+0 30.9	+0.3894	0.5521	0.1322	+68-7		
3.7	2.48	2.5	24 36.2	12	4.1	+2 44.6	-0.1218	0.5516	0.1376	+37-33		
6.3	+2.47	+1.9	+23 21.2	13	54.1	+4 30.8	+0.9555	0.5512	-0.1419	+90+24		
6.4	2.53	1.1	23 49.1	19	24.6	+9 49.7	-0.3571	0.5498	0.1545	+24-48		
6.2	2.53	0.6	22 52.7	21	46.6	-11 53.2	+0.2681	0.5492	0.1598	+60-16		
5.5	2.51	0.2	21 49.8	22	26.4	-11 14.8	+1.2755	0.5491	0.1613	+81+50		
6.4	2.57	+0.1	23 23.7	26	1 4.0	-8 42.6	-0.8155	0.5483	0.1670	-2-67		
6.0	+2.54	+0.8	+21 1.0	4	4.4	-5 48.4	+1.1895	0.5474	-0.1735	+90+38		
5.5	2.57	1.8	20 43.8	9	38.5	+0 25.8	+0.4909	0.5458	0.1850	+76-7		
6.5	2.58	2.4	20 18.5	12	59.5	+2 48.2	+0.3037	0.5447	0.1917	+62-17		
6.5	2.58	2.4	20 16.3	13	1.8	+2 50.5	+0.3345	0.5447	0.1918	+64-16		
6.5	2.58	2.5	19 58.2	13	6.8	+2 55.3	+0.6354	0.5447	0.1920	+88 0		
6.3	+2.58	-2.5	+19 50.7	13	9.2	+2 57.7	+0.7594	0.5447	-0.1921	+90+6		
6.1	2.59	3.4	19 9.0	17	50.5	+7 29.3	+0.5676	0.5432	0.2011	+81-5		
6.4	2.58	6.0	15 43.9	27	7 54.0	-2 55.5	+1.1314	0.5390	0.2256	+90+26		
6.3	2.61	6.2	16 57.1	9	52.7	-1 0.8	-0.5887	0.5384	0.2287	+13-70		
6.2	2.58	7.1	14 45.5	14	42.7	+3 39.6	+0.5675	0.5370	0.2360	+80-9		
6.5	+2.58	-7.3	+14 43.8	15	42.8	+4 37.8	+0.3589	0.5368	-0.2375	+65-20		
5.6	2.58	7.7	14 24.5	18	23.1	+7 12.8	+0.0518	0.5360	0.2413	+46-36		
5.0	2.57	8.8	12 50.9	28	1 12.7	-10 11.1	-0.0127	0.5344	0.2502	+43-40		
4.6	2.53	9.6	10 24.7	5	48.5	-5 44.2	+1.3348	0.5334	0.2556	+84+42		
1.3	2.56	9.5	12 22.8	6	1.3	-5 31.9	-0.7470	0.5334	0.2559	+5-78		
5.9	+2.52	-10.7	+9 12.9	14	2.9	+2 14.1	+0.4198	0.5320	-0.2642	+68-20		

[Eph 13]

ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

FEBRUARY.

THE STAR'S					AT CONJUNCTION IN R. A.					Limiting Parallel.
Name.	Mag.	Red'ns from 1915.0.		Apparent Declination.	Washington Mean Time.	Hour Angle <i>H</i>	<i>Y</i>	<i>x'</i>	<i>y'</i>	N. S.
		$\Delta\alpha$	$\Delta\delta$							
		<i>s</i>	<i>"</i>	<i>s</i>	<i>d h m</i>	<i>h m</i>				<i>s</i>
45 Leonis	5.8	+2.54	-10.8	+10 11.6	28 15 10.9	+ 3 19.9	-0.8842	0.5318	-0.2652	-3-50
ρ Leonis	3.8	2.53	11.1	9 44.5	17 38.7	+ 5 42.9	-1.0761	0.5314	0.2674	-15-30
48 Leonis	5.2	2.49	11.3	7 23.3	18 36.7	+ 6 39.1	+1.0742	0.5314	0.2682	+90-16
49 Leonis	5.7	+2.52	-11.3	+ 9 5.2	18 42.8	+ 6 45.0	-0.6913	0.5313	-0.2683	+ 8-81

MARCH.

37 Sextantis	6.3	+2.49	-11.9	+ 6 49.1	1 0 0.2	+11 52.2	+0.1984	0.5308	-0.2724	+55-32
56 Leonis	6.1	2.48	12.5	6 38.2	4 45.1	- 7 32.1	-0.9161	0.5305	0.2754	-5-82
<i>d</i> Leonis	5.0	2.44	12.7	4 4.2	6 55.9	- 5 25.5	+1.0960	0.5304	0.2767	+90-10
75 Leonis	5.4	+2.41	-13.5	+ 2 28.5	14 56.1	+ 2 19.3	+0.4869	0.5305	-0.2802	+73-19
76 Leonis	6.0	2.41	13.6	2 6.8	15 43.1	+ 3 4.8	+0.6344	0.5306	-0.2805	+84-11
79 Leonis	5.5	2.40	13.8	+ 1 52.2	18 9.9	+ 5 26.9	+0.1926	0.5307	-0.2812	+54-34
<i>v</i> Leonis	4.5	2.37	14.2	- 0 21.5	2 0 19.5	+11 24.6	+0.7139	0.5314	-0.2823	+90-7
9 B. Virginis	6.2	2.36	14.6	+ 0 9.0	6 4.4	- 7 1.7	-1.4228	0.5323	-0.2825	-52-72
78 B. Virginis	6.5	+2.27	-14.9	+ 5 15.0	17 58.5	+ 4 29.2	+0.6753	0.5351	-0.2801	+84-9
χ Virginis	4.8	2.21	15.2	7 31.9	5 35.8	- 8 16.6	-0.2537	0.5392	0.2742	+20-58
ψ Virginis	5.0	2.18	15.2	9 4.9	12 31.2	- 1 35.1	-0.5770	0.5421	-0.2689	+12-80
49 Virginis	5.2	2.14	15.2	10 17.4	18 39.4	+ 4 20.6	-0.9957	0.5451	-0.2631	-12-90
<i>t</i> Virginis	5.7	2.09	15.0	12 10.2	4 3 4.1	-11 32.2	-1.1828	0.5495	-0.2535	-28-90
75 Virginis	5.6	+2.07	-14.4	-14 55.8	5 45.9	- 8 56.1	+0.8080	0.5511	-0.2500	+75-1
83 Virginis	5.6	2.04	14.3	15 45.4	10 51.2	- 4 1.4	+0.3829	0.5541	-0.2427	+50-24
85 Virginis	6.1	2.04	14.4	15 20.7	11 20.0	- 3 33.6	-0.1457	0.5543	-0.2420	+30-52
43 H. Virginis	5.5	1.95	13.8	17 48.5	0 6.0	+ 8 44.7	-0.6310	0.5623	-0.2205	+3-87
231 G. Virginis	6.4	1.95	13.6	18 11.7	0 47.7	+ 9 24.8	-0.3965	0.5627	-0.2192	+15-48
236 G. Virginis	5.7	+1.94	-13.6	-18 19.6	1 27.6	+10 3.2	-0.4096	0.5632	-0.2179	+14-90
9 G. Libræ	6.5	1.90	13.0	20 4.2	8 12.7	- 7 26.7	-0.0851	0.5675	-0.2045	+20-49
17 G. Libræ	6.4	1.86	12.8	20 40.2	12 52.8	- 2 57.1	-0.2634	0.5705	-0.1944	+19-59
18 G. Libræ	6.1	1.86	12.7	20 58.3	13 18.2	- 2 32.6	-0.1923	0.5708	-0.1935	+21-55
43 B. Libræ	5.7	1.84	12.8	21 2.2	17 26.0	+ 1 25.8	-0.9976	0.5734	-0.1841	-17-90
47 G. Libræ	6.1	+1.80	-12.2	-21 42.3	21 5.9	+ 4 57.2	-0.8944	0.5757	-0.1753	+17-90
64 G. Libræ	5.8	1.77	12.0	22 5.3	6 1 4.6	+ 8 46.7	-1.1871	0.5780	-0.1654	-40-90
153 H. Libræ	6.3	1.72	11.1	24 12.3	7 41.9	- 8 51.5	-0.0955	0.5818	-0.1482	+22-49
42 Libræ	5.0	1.69	11.2	23 32.7	10 30.5	- 6 9.7	-1.1658	0.5833	-0.1406	-41-90
<i>b</i> Scorpii	4.7	1.66	10.3	25 29.8	14 39.5	- 2 10.6	+0.2424	0.5853	-0.1290	+39-30
<i>A</i> Scorpii	4.6	+1.65	-10.4	-25 4.6	15 41.3	- 1 11.2	-0.3126	0.5858	-0.1261	+ 9-61
31 B. Scorpii	5.4	1.64	10.7	24 17.0	15 48.5	- 1 4.3	-1.1287	0.5859	-0.1258	-39-90
3 Scorpii	5.9	1.65	10.4	24 59.7	16 5.7	- 0 47.9	-0.4460	0.5860	-0.1250	+2-75
4 Scorpii	5.7	1.65	10.0	26 1.1	16 24.6	- 0 20.7	+0.5482	0.5862	-0.1240	+55-13
40 B. Scorpii	5.4	1.63	10.5	24 35.4	17 37.2	+ 0 40.0	-1.0432	0.5867	-0.1206	-33-90
π Scorpii	3.0	+1.64	-10.1	-25 52.4	17 42.5	+ 0 45.1	+0.2423	0.5867	-0.1203	+38-90
48 B. Scorpii	4.0	1.62	10.1	25 37.9	19 27.1	- 2 25.5	-0.2066	0.5875	-0.1153	+14-90
65 B. Scorpii	5.5	1.60	9.8	26 6.1	21 17.0	+ 4 10.9	+0.0623	0.5882	-0.1099	+27-40
85 B. Scorpii	6.0	1.57	10.0	25 15.9	23 54.0	+ 6 41.5	-1.0621	0.5892	-0.1021	-36-90
δ Scorpii	3.1	1.55	9.8	25 23.6	7 2 18.7	+ 9 0.4	-1.1711	0.5900	-0.0949	-40-90
ϵ Scorpii	1.2	+1.52	- 9.3	-26 14.8	5 26.5	-11 59.5	-0.5889	0.5910	-0.0853	- 9-80
116 B. Scorpii	6.2	1.51	9.3	26 21.4	6 11.6	-11 16.3	-0.5418	0.5912	-0.0830	- 7-81
τ Scorpii	2.0	1.51	8.6	28 2.6	7 53.0	- 9 39.0	+1.0315	0.5917	-0.0778	+62-90
134 B. Scorpii	6.4	1.47	8.6	27 18.0	11 5.5	- 6 34.4	+0.0448	0.5924	-0.0678	+22-41
135 B. Scorpii	6.0	1.47	8.2	28 21.3	11 20.8	- 6 19.7	+1.0971	0.5924	-0.0670	+62-20
95 G. Ophiuchi	6.1	+1.36	- 7.9	-27 39.6	21 44.7	+ 3 38.5	-0.1329	0.5936	-0.0347	+11-52
43 Ophiuchi	5.4	1.31	7.5	28 3.8	1 52.8	- 7 36.4	+0.1642	0.5935	-0.0209	+25-34
163 G. Ophiuchi	6.3	1.23	7.1	27 50.8	9 26.5	- 9 8.6	-0.1234	0.5927	+0.0034	+ 8-51
X Sagittarii (<i>var.</i>)	4.4	1.21	7.0	27 48.1	11 3.9	- 7 35.2	-0.1594	0.5924	-0.0085	+ 7-53
4 G. Sagittarii	6.2	1.20	7.3	26 56.9	11 25.3	- 7 14.7	-1.0275	0.5923	-0.0097	-42-90
10 G. Sagittarii	5.7	+1.17	- 6.7	-28 3.2	14 32.3	- 4 15.3	+0.1475	0.5916	+0.0196	+23-35

EMENTS FOR THE PREDICTION OF OCCULTATIONS.

MARCH.

THE STAR'S					AT CONJUNCTION IN R. A.					Limiting Parallels.	
	Mag.	Red'ns from 1915.0.		Apparent Declination.	Washington Mean Time.	Hour Angle, H	Y	x'	y'	N.	S.
		Δα	Δδ		d h m	h m					
ii	5.8	+1.17	6.4	28 45.1	8 15 16.5	-3 33.0	+0.8762	0.5914	+0.0219	+61	+ 8
arii	4.7	1.13	6.2	28 28.1	18 53.1	0 5.2	+0.6871	0.5903	0.0332	+59	- 4
-28° 14268	6.4	1.11	6.0	28 55.3	20 22.1	+1 20.1	+1.2039	0.5898	0.0379	+61	+39
arii	6.3	1.09	6.1	28 19.1	22 27.7	+3 20.7	+0.6724	0.5890	0.0443	+58	- 5
arii	6.0	1.09	5.9	28 41.0	22 27.9	+3 20.9	+1.0459	0.5890	0.0443	+61	+21
arii	4.7	+1.07	6.5	27 4.6	22 44.4	+3 36.6	-0.5877	0.5880	0.0452	-12	-86
arii	6.1	1.07	5.9	28 28.3	9 0 14.4	+5 3.1	+0.9130	0.5883	0.0498	+62	+11
arii	6.2	1.03	6.4	26 41.3	2 29.1	+7 12.3	-0.7954	0.5874	0.0507	-23	-90
arii	6.3	1.03	6.3	26 48.6	2 37.7	+7 20.5	-0.6613	0.5873	0.0571	-16	-90
arii	6.5	1.02	6.4	26 38.3	2 57.5	+7 39.5	-0.8188	0.5871	0.0581	-24	-90
arii	3.3	+0.96	5.8	27 4.8	9 27.8	-10 5.8	+0.0756	0.5839	+0.0775	+25	-39
arii	2.1	0.91	5.7	26 24.3	13 15.6	-6 27.0	-0.3042	0.5817	0.0885	+6	-63
arii	5.9	0.84	5.4	26 3.1	20 25.5	+0 26.1	+0.0380	0.5772	0.1085	+26	-42
arii	4.9	0.82	5.5	25 24.3	21 21.8	+1 20.2	-0.5254	0.5766	0.1110	-3	-80
arii	4.9	0.78	5.5	24 40.6	10 1 18.8	+5 8.1	-0.8198	0.5738	0.1216	-18	-90
arii	5.8	+0.74	5.1	24 54.4	5 42.7	+9 21.9	-0.0218	0.5706	+0.1328	+25	-45
arii	4.7	0.74	5.1	25 4.4	5 59.2	+9 37.9	+0.1867	0.5704	0.1335	+36	-33
arii	6.3	0.71	5.4	23 37.4	7 17.8	+10 53.5	-1.1366	0.5694	0.1368	-38	-90
arii	6.1	0.71	5.4	23 37.6	7 25.1	+11 0.5	-1.1175	0.5693	0.1371	-36	-90
arii	6.3	0.66	4.9	24 9.3	13 19.6	-7 18.2	+0.2820	0.5648	0.1513	+43	-28
arii	6.1	+0.62	5.0	22 58.4	16 20.1	-4 24.4	-0.4781	0.5624	+0.1583	+5	-75
arii	6.5	0.61	5.0	22 50.2	17 20.0	-3 26.7	-0.4616	0.5616	0.1605	+6	-73
corni	5.7	0.56	4.8	22 4.5	23 28.3	+2 28.4	-0.2273	0.5567	0.1738	+19	-57
corni	6.2	0.52	4.3	22 40.5	11 4 28.9	+7 18.2	+1.2956	0.5526	0.1839	+67	+44
corni	5.7	0.40	4.7	18 14.8	15 50.9	-5 43.4	-1.1181	0.5435	0.2045	-29	-90
corni	6.2	+0.40	4.3	19 22.0	18 1.5	-3 37.2	+0.5028	0.5418	+0.2081	+62	-17
corni	6.5	0.38	4.6	17 51.8	18 37.4	-3 2.5	-0.9461	0.5413	0.2090	-16	-90
corni	4.2	0.37	4.5	17 34.4	20 57.8	-0 46.0	-0.7500	0.5395	0.2127	-4	-90
US	6.0	...	...	17 18.1	23 7.0	+1 18.0	-0.5828	0.5358	0.2154	+6	-82
corni	6.1	0.34	4.2	17 41.9	12 1 13.5	+3 20.3	+0.2929	0.5362	0.2190	+52	-28
corni	5.4	+0.34	3.9	18 20.6	2 33.1	+4 37.3	+1.2622	0.5352	+0.2209	+72	+35
corni	6.3	0.34	4.0	17 49.2	2 42.0	+4 45.9	+0.7463	0.5351	0.2211	+72	- 3
corni	4.3	0.32	4.1	17 11.9	4 35.1	+6 35.4	+0.5123	0.5336	0.2237	+65	-17
corni	5.1	0.24	4.0	14 25.7	13 51.5	-8 26.1	-0.2736	0.5270	0.2353	+25	-59
corni	6.0	0.24	3.9	14 47.4	14 35.4	-7 43.6	+0.2802	0.5265	0.2361	+54	-29
corni	5.8	+0.25	3.8	15 8.4	15 2.7	-7 17.2	+0.7579	0.5262	+0.2366	+75	- 4
corni	6.1	0.22	3.9	13 7.2	17 49.8	-4 35.4	-0.7112	0.5244	0.2396	+2	-90
corni	5.2	0.22	3.7	13 57.2	19 34.8	-2 53.7	+0.5897	0.5232	0.2414	+73	-13
URY	0.7	...	...	12 53.8	20 35.9	-1 54.4	-0.2820	0.4962	0.2427	+26	-60
NEW MOON.											
1m	3.7	0.00	+ 4.7	+14 54.6	17 15 6.0	-10 41.6	-1.0811	0.5042	+0.2291	-17	-75
1m	6.2	+0.02	4.8	14 13.7	17 22.1	-8 29.4	+0.1837	0.5049	0.2266	+54	-30
1m	6.1	0.02	5.2	15 58.6	19 24.2	-6 30.9	-1.2798	0.5055	0.2243	-35	-74
is	5.8	0.04	5.6	16 32.1	23 50.9	-2 12.0	-0.9095	0.5070	0.2191	-6	-73
is	5.1	+0.06	+ 6.1	+17 24.3	18 4 36.5	+2 25.3	-0.8409	0.5087	+0.2131	-2	-73
is	6.4	0.08	6.4	17 50.8	7 53.5	+5 36.5	-0.6365	0.5099	0.2088	+10	-71
is	6.5	0.10	6.4	17 37.6	9 58.8	+7 38.0	+0.0394	0.5107	0.2059	+46	-34
is	6.4	0.11	6.3	16 49.7	10 48.7	+8 26.5	+1.0920	0.5110	0.2048	+90	+24
is	5.9	0.10	6.8	19 6.1	11 25.7	+9 2.4	-1.2919	0.5112	0.2039	-39	-71
is	5.6	+0.13	+ 7.2	+19 30.6	15 15.5	-11 14.7	-0.9733	0.5128	+0.1985	-11	-70
is	6.2	0.18	7.6	19 28.8	21 35.5	-5 6.2	+0.2860	0.5154	0.1889	+60	-19
is	5.4	0.20	8.4	21 35.8	1 40.5	-1 8.6	-1.2965	0.5172	0.1825	-43	-68
is	5.7	0.24	8.0	19 39.1	3 28.1	+0 35.7	+1.1798	0.5180	0.1795	+90	+36
is (mean)	4.6	0.31	8.7	21 0.2	11 47.3	+8 39.4	+1.1200	0.5217	0.1653	+90	+32
is	5.8	+0.43	+10.1	+24 25.6	23 55.5	-3 35.3	-0.8012	0.5272	+0.1428	-2	-66

ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

MARCH.

THE STAR'S					AT CONJUNCTION IN R. A.							Limit- ing Pa- ra- llels.
Name.	Mag.	Red'ns from 1915.0.		Apparent Declina- tion.	Washington Mean Time.		Hour Angle, H	Y	x'	y'	N. S.	
		$\Delta\alpha$	$\Delta\delta$		d	h m						
7 Tauri	5.9	+0.49	+10.1	+24 11.0	20	4 46.5	+1 6.5	+0.1385	0.5295	+0.1333	+52-20	
11 Tauri	6.1	0.52	10.5	25 3.5		7 46.0	+4 0.2	-0.4427	0.5308	0.1272	+10-50	
16 Tauri	5.4	0.55	10.2	24 1.5		9 41.3	+5 51.7	+0.9429	0.5316	0.1232	+00-25	
17 Tauri	3.8	0.55	10.1	23 51.0		9 43.5	+5 53.9	+1.1425	0.5317	0.1231	+00-40	
18 Tauri	5.6	0.55	10.4	24 34.6		9 50.9	+6 1.0	+0.3521	0.5317	0.1229	+00-8	
q Tauri	4.3	+0.56	+10.2	+24 12.3		9 52.5	+6 2.5	+0.7678	0.5317	+0.1228	+00-14	
20 Tauri	4.1	0.56	10.2	24 6.3		10 10.2	+6 19.7	+0.9131	0.5318	0.1222	+00-23	
21 Tauri	5.8	0.56	10.3	24 17.6		10 12.3	+6 21.8	+0.7100	0.5319	0.1221	+00-10	
22 Tauri	6.5	0.56	10.3	24 16.0		10 16.3	+6 25.6	+0.7475	0.5319	0.1220	+00-13	
η Tauri	3.0	0.57	10.2	23 50.8		10 57.3	+7 5.3	+1.2066	0.5322	0.1206	+70-59	
14 H. Tauri	5.3	+0.58	+10.6	+25 19.6		12 15.8	+8 21.2	-0.1895	0.5328	+0.1178	+33-35	
p Tauri	5.6	0.72	11.0	26 15.8		21 49.0	+6 24.5	-0.1996	0.5368	0.0971	+32-54	
φ Tauri	5.0	0.78	11.3	27 9.1	21	2 11.6	+2 10.6	-0.7801	0.5385	-0.0873	-1-45	
χ Tauri	5.3	0.80	10.8	25 26.0		3 14.7	+1 9.7	+1.2144	0.5389	0.0849	+85-49	
17 B. Aurigæ	6.0	1.01	11.3	27 45.6		16 56.4	+11 55.8	-0.4174	0.5436	0.0527	+20-47	
38 B. Aurigæ	6.5	+1.00	+11.0	+27 34.9		22 16.3	+6 46.8	+0.0261	0.5451	+0.0397	+45-10	
47 B. Aurigæ	6.0	1.13	11.1	27 55.6	22	0 33.4	+4 34.4	-0.2716	0.5457	0.0341	+28-32	
354 B. Tauri	6.4	1.20	10.9	27 52.5		5 34.8	+0 16.5	-0.0737	0.5468	0.0217	+39-20	
22 Aurigæ	6.4	1.23	11.2	28 51.6		6 37.6	+1 17.2	-1.1380	0.5470	0.0190	-31-61	
β Tauri	1.8	1.25	11.0	28 32.4		7 55.7	+2 32.6	-0.7622	0.5473	0.0158	-1-61	
107 B. Aurigæ	6.5	+1.31	+10.4	+27 36.6		12 13.7	+6 41.6	+0.3063	0.5480	+0.0050	+63-1	
112 B. Aurigæ	5.7	1.31	10.1	26 52.5		12 46.9	+7 13.6	+1.1185	0.5481	+0.0036	+90-49	
406 B. Tauri	5.6	1.42	10.1	27 56.8		18 53.0	-10 53.0	-0.0859	0.5490	-0.0118	+39-21	
136 Tauri	4.6	1.43	9.9	27 35.8		19 56.0	-9 52.2	+0.2853	0.5491	-0.0145	+62-1	
154 B. Aurigæ	6.4	1.47	10.3	28 56.0		21 20.3	-8 30.9	-1.2054	0.5492	-0.0181	-40-61	
415 B. Tauri	6.1	+1.49	+9.7	+27 34.3		23 19.8	-6 35.6	+0.2478	0.5494	-0.0231	+59-4	
49 Aurigæ	5.1	1.73	8.5	28 5.5	23	14 24.9	+7 57.8	-0.9566	0.5496	-0.0613	-14-61	
37 Geminorum	5.7	1.83	6.6	25 29.1		23 21.4	+7 24.5	+1.2338	0.5496	-0.0835	+82-53	
39 Geminorum	6.2	1.86	6.7	26 11.7	24	0 53.5	+5 55.6	+0.3301	0.5487	-0.0873	+64-5	
40 Geminorum	6.3	1.86	6.6	26 1.9		1 11.2	+5 38.4	+0.4814	0.5487	-0.0880	+76-2	
47 Geminorum	5.6	+1.96	+6.3	+26 59.9		6 27.8	-0 32.8	-1.0645	0.5480	-0.1009	-22-43	
52 Geminorum	6.1	1.95	5.5	25 2.1		7 58.1	+0 54.3	+0.9072	0.5478	-0.1045	+00-25	
134 B. Geminorum	6.5	1.99	6.0	26 50.7		8 59.2	+1 53.3	-1.1591	0.5477	-0.1069	-31-63	
A Geminorum	5.1	2.00	5.1	25 13.0		11 52.0	+4 41.0	+0.2830	0.5471	-0.1138	+61-10	
176 B. Geminorum	6.3	2.08	4.0	24 33.1		18 29.7	+11 4.0	+0.1939	0.5458	-0.1293	+53-17	
181 B. Geminorum	6.0	+2.08	+3.9	+24 25.0		18 55.7	+11 29.1	+0.2836	0.5457	-0.1303	+61-12	
κ Geminorum	3.7	2.12	3.7	24 36.2		21 17.0	-10 14.5	-0.2304	0.5453	-0.1356	+31-39	
82 Geminorum	6.3	2.12	3.0	23 21.2		23 9.2	-8 26.1	-0.8554	0.5448	-0.1399	+90-18	
5 B. Cancri	6.4	2.20	2.4	23 49.1	25	4 46.2	-3 0.7	-0.4644	0.5435	-0.1523	+18-54	
9 Cancri	6.2	2.21	1.8	22 52.8		7 10.8	-0 41.0	+0.1663	0.5430	-0.1575	+53-21	
μ Cancri	5.5	+2.19	+1.3	+21 49.8		7 51.4	-0 1.8	+1.1810	0.5428	-0.1580	+00-39	
35 B. Cancri	6.4	2.26	1.5	23 29.7		10 32.0	+2 33.2	-0.9232	0.5421	-0.1646	-9-47	
49 B. Cancri	6.0	2.24	+0.2	21 1.0		13 35.9	+5 31.0	+1.0970	0.5413	-0.1710	+00-31	
η Cancri	5.5	2.30	-0.6	20 43.8		19 16.0	+10 59.7	+0.3968	0.5399	-0.1824	+68-11	
39 Cancri	6.5	2.32	1.3	20 18.5		22 40.5	+9 42.8	+0.2105	0.5390	-0.1890	+50-22	
40 Cancri	6.5	+2.32	-1.3	+20 16.3		22 42.9	+9 40.4	+0.2415	0.5390	-0.1891	+58-20	
102 B. Cancri	6.5	2.32	1.4	19 58.3		22 48.0	+9 35.5	+0.5443	0.5390	-0.1893	+70-5	
ε Cancri	6.3	2.32	1.4	19 50.7		22 50.4	+9 33.1	+0.6690	0.5390	-0.1894	+00-1	
139 B. Cancri	6.1	2.35	2.3	19 9.0	26	3 36.5	+4 56.7	+0.4790	0.5378	-0.1983	+74-10	
227 B. Cancri	6.4	2.41	5.3	15 43.7		17 52.4	+8 50.9	+1.0557	0.5346	-0.2228	+00-21	
12 B. Leonis	6.3	+2.45	-5.2	+16 57.1		19 52.6	+10 47.2	-0.6698	0.5342	-0.2260	+8-73	
7 Leonis	6.2	2.45	6.5	14 45.5	27	0 46.0	-8 29.0	+0.4952	0.5322	-0.2334	+74-13	
11 Leonis	6.5	2.45	6.6	14 43.8		1 46.7	-7 30.2	+0.2868	0.5330	-0.2348	+60-24	
ψ Leonis	5.6	2.47	7.1	14 24.5		4 28.7	+4 53.5	-0.0187	0.5326	-0.2387	+43-39	
ν Leonis	5.0	2.49	8.4	12 50.9		11 21.8	+1 46.2	-0.0762	0.5317	-0.2478	+40-44	
A Leonis	4.6	+2.47	-9.5	+10 24.7		15 59.4	+6 14.8	+1.2783	0.5312	-0.2534	+00-30	

ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

MARCH.

THE STAR'S					AT CONJUNCTION IN R. A.					Limiting Par- allels.	
Name.	Mag.	Red'ns from 1915.0.		Apparent Declina- tion.	Washington Mean Time.	Hour Angle, H	Y	x'	y'	N.	S.
		$\Delta\alpha$	$\Delta\delta$								
		α	δ	α	d h m	h m				α	δ
Leonis	1.3	+2.51	-9.1	+12 22.8	27 16 12.3	+6 27.3	-0.8060	0.5312	-0.2536	+1	-78
Leonis	5.9	2.50	10.8	9 12.9	28 0 15.8	-9 44.9	+0.3712	0.5307	0.2623	+65	-23
Leonis	5.8	2.53	10.7	10 11.6	1 24.0	-8 38.9	-0.9312	0.5306	0.2634	-6	-80
Leonis	3.8	2.53	11.1	9 44.5	3 52.0	-6 15.7	-1.1194	0.5306	0.2657	-19	-80
Leonis	5.2	2.50	11.7	7 23.3	4 50.1	-5 19.4	+1.0306	0.5306	0.2666	+90	+13
Leonis	5.7	+2.52	-11.4	+9 5.2	4 56.1	-5 13.6	-0.7335	0.5307	-0.2667	+6	-80
Sextantis	6.3	2.52	12.4	6 49.1	10 13.4	-0 6.5	+0.1623	0.5307	0.2710	+52	-34
Leonis	6.1	2.54	13.0	6 38.1	14 57.6	+4 28.5	-0.9433	0.5311	0.2744	-6	-83
Leonis	5.0	2.51	13.6	4 4.2	17 7.9	+6 34.6	+1.0604	0.5313	0.2757	+90	+14
Leonis	5.4	2.52	14.6	2 28.4	29 1 5.1	-9 43.6	+0.4697	0.5325	0.2798	+72	-19
Leonis	6.0	+2.52	-14.7	+2 6.8	1 51.7	-8 58.5	+0.6176	0.5326	-0.2801	+83	-12
Leonis	5.5	2.53	15.0	+1 52.2	4 17.2	-6 37.7	+0.1812	0.5331	0.2810	+54	-34
Leonis	4.5	2.52	15.7	0 21.5	10 23.0	+0 43.8	+0.7081	0.5345	0.2825	+88	-7
B. Virginis	6.2	2.54	16.1	0 9.0	16 3.4	+4 45.4	-1.4060	0.5362	0.2831	-48	-76
B. Virginis	6.5	2.53	17.2	-5 15.1	30 3 45.7	-7 55.6	+0.6939	0.5406	0.2815	+85	-8
Virginis	4.8	+2.54	-17.9	+7 32.0	15 8.4	+3 4.0	-0.2092	0.5460	-0.2761	+31	-55
Virginis	5.0	2.54	18.1	9 5.0	21 53.8	+9 35.4	-0.5185	0.5497	0.2712	+15	-75
Virginis	5.2	2.54	18.2	10 17.5	31 3 52.3	-8 38.6	-0.9229	0.5533	0.2656	-8	-90
Virginis	5.7	2.54	18.2	12 16.2	12 2.9	+0 45.4	-1.0952	0.5586	0.2562	-21	-90
Virginis	5.6	2.54	18.0	14 55.9	14 39.9	+1 45.9	+0.8722	0.5603	0.2527	+75	+3
Virginis	5.6	+2.54	-17.8	-15 45.4	19 36.0	+6 31.2	+0.4592	0.5637	-0.2456	+63	-20
Virginis	6.1	+2.54	-17.9	-15 20.7	20 3.9	+6 58.2	-0.0613	0.5640	-0.2448	+35	-47

APRIL.

H. Virginis	5.5	+2.53	-17.3	-17 48.6	1	8	25.6	-5 7.9	-0.5240	0.5727	-0.2233	+8	-77
G. Virginis	6.4	2.53	17.2	18 11.7		9	6.0	-4 29.0	-0.2922	0.5732	0.2220	+20	-61
G. Virginis	5.7	2.53	17.2	18 19.6		9	44.6	+3 51.9	-0.3043	0.5737	0.2207	+19	-61
G. Libræ	6.5	2.53	16.6	20 4.3		16	16.4	+2 24.9	+0.0226	0.5783	0.2071	+34	-42
G. Libræ	6.4	2.53	16.2	20 49.2		20	47.2	+6 45.1	-0.1483	0.5813	0.1969	+25	-52
G. Libræ	6.1	+2.53	-16.2	-20 58.4		21	11.9	+7 8.9	-0.0779	0.5816	-0.1960	+28	-48
B. Libræ	5.7	2.54	16.4	21 2.3	2	1	11.5	+10 59.0	-0.7781	0.5843	0.1864	-10	-90
G. Libræ	6.1	2.51	15.5	21 42.4		4	44.0	+9 37.0	-0.7617	0.5866	0.1776	-10	-90
G. Libræ	5.8	2.50	15.2	22 5.4		8	35.0	-5 55.3	-1.0464	0.5889	0.1675	-29	-90
B. Libræ	6.3	2.49	14.2	24 12.3		14	59.3	+0 13.4	+0.0337	0.5925	0.1500	+29	-42
Libræ	5.0	+2.47	-14.1	-23 32.8		17	42.5	+2 49.9	-1.0181	0.5939	-0.1422	-29	-90
Scorpii	4.7	2.47	13.2	25 29.8		21	43.8	+6 41.3	+0.3718	0.5957	0.1305	+45	-23
Scorpii	4.6	2.46	13.2	25 4.7		22	43.6	+7 38.6	-0.1742	0.5962	0.1275	+16	-54
B. Scorpii	5.4	2.45	13.4	24 17.1		22	50.6	+7 45.3	-0.9780	0.5962	0.1271	-28	-90
Scorpii	5.9	2.46	13.2	24 59.8		23	7.3	+8 1.3	-0.3054	0.5963	0.1263	+10	-62
Scorpii	5.7	+2.47	-12.9	-26 1.2		23	25.6	+8 18.8	+0.6743	0.5964	-0.1254	+62	-6
B. Scorpii	5.4	2.45	13.1	24 35.4	3	0	36.0	+9 26.4	-0.8927	0.5970	0.1218	-23	-90
Scorpii	3.0	2.46	12.8	25 52.4		0	41.1	+9 31.3	+0.3738	0.5970	0.1216	+45	-23
B. Scorpii	4.9	2.45	12.7	25 38.0		2	22.5	+11 8.5	-0.0672	0.5977	0.1165	+21	-47
B. Scorpii	6.4	2.43	13.0	24 29.8		2	36.0	+11 21.4	-1.2248	0.5977	0.1158	-50	-84
B. Scorpii	5.5	+2.44	-12.3	-26 6.2		4	9.1	-11 9.4	+0.1989	0.5982	-0.1110	+34	-32
B. Scorpii	6.0	2.42	12.3	25 15.9		6	41.4	-8 43.5	-0.9077	0.5991	0.1031	-25	-90
Scorpii	3.1	2.40	12.0	25 23.6		9	2.0	-6 28.8	-1.0138	0.5997	0.0957	-33	-90
Scorpii	1.2	2.39	11.4	26 14.8		12	4.4	-3 34.0	-0.4381	0.6000	0.0860	-1	-72
B. Scorpii	6.2	2.39	11.3	26 21.4		12	48.3	-2 52.0	-0.3913	0.6006	0.0837	+1	-69
Scorpii	2.9	+2.40	-10.6	-28 2.6		14	26.8	-1 17.6	+1.1613	0.6009	-0.0784	+62	+33
B. Scorpii	6.4	2.36	10.5	27 18.0		17	34.1	+1 41.7	+0.1900	0.6013	0.0683	+30	-33
B. Scorpii	6.0	2.38	10.1	28 21.3		17	49.0	+1 56.0	+1.2284	0.6013	0.0674	+62	+42
B. Ophiuchi	6.2	2.28	9.7	26 24.1	4	1	55.7	+9 42.0	-1.1681	0.6016	0.0468	+50	-90
G. Ophiuchi	6.1	2.28	9.0	27 39.6		3	57.3	+11 38.5	+0.0196	0.6014	0.0341	+18	-43
Oph. (1st star)	5.4	+2.24	-9.6	-26 28.0		5	4.4	-11 17.3	-1.2009	0.6013	-0.0304	+54	-85

[Eph 13]

ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

APRIL.

THE STAR'S					AT CONJUNCTION IN R. A.				
Name.	Mag.	Red'ns from 1915.0.		Apparent Declination.	Washington Mean Time.	Hour Angle, <i>H</i>	<i>Y</i>	<i>x'</i>	<i>y'</i>
		$\Delta\alpha$	$\Delta\delta$						
		<i>s</i>	<i>"</i>	<i>s</i>	<i>d</i>	<i>h</i>	<i>m</i>	<i>h</i>	<i>m</i>
43 Ophiuchi	5.4	+2.25	-8.4	-28 3.8	4	7 59.7	-8 29.3	+0.3149	0.6009 -0.0207
163 G. Ophiuchi	6.3	2.17	7.5	27 50.8	15	23.9	-1 23.9	+0.0333	0.5991 +0.0037
X Sagittarii (<i>var.</i>)	4.4	2.15	7.3	27 48.1	16	59.3	+0 7.6	-0.0019	0.5985 -0.0089
4 G. Sagittarii	6.2	2.13	7.6	26 56.9	17	20.3	+0 27.6	-0.8609	0.5984 -0.0100
10 G. Sagittarii	5.7	2.12	6.8	28 3.2	20	23.9	+3 23.6	+0.3030	0.5973 -0.0200
210 B. Scorpii	5.8	+2.12	-6.4	-28 45.1	21	7.3	+4 5.2	+1.0249	0.5970 +0.0223
38 B. Sagittarii	4.7	2.08	6.0	28 28.1	5	0 40.3	+7 29.4	+0.8390	0.5954 -0.0337
48 G. Sagittarii	6.3	2.04	5.7	28 19.1	4	11.5	+10 51.9	+0.8256	0.5936 -0.0448
62 B. Sagittarii	6.0	2.04	5.5	28 41.0	4	11.7	+10 52.0	+1.1960	0.5936 -0.0448
66 B. Sagittarii	4.7	2.01	6.0	27 4.5	4	27.9	+11 7.5	-0.4236	0.5935 -0.0456
58 G. Sagittarii	6.1	+2.02	-5.4	-28 28.3	5	56.7	-11 27.3	+1.0648	0.5927 +0.0503
68 G. Sagittarii	6.2	1.96	5.7	26 41.3	8	9.5	-9 20.0	-0.6293	0.5914 -0.0571
69 G. Sagittarii	6.3	1.96	5.6	26 48.6	8	18.0	-9 11.7	-0.4962	0.5913 -0.0575
86 B. Sagittarii	6.5	1.95	5.6	26 38.3	8	37.5	-8 53.1	-0.6524	0.5910 -0.0585
φ Sagittarii	3.3	1.89	4.6	27 4.8	15	3.1	-2 43.1	+0.2359	0.5870 -0.0778
σ Sagittarii	2.1	+1.83	-4.4	-26 24.3	18	48.6	+0 53.4	-0.1411	0.5843 +0.0888
201 B. Sagittarii	5.9	1.74	3.6	26 3.1	6	1 55.1	+7 43.0	+0.1991	0.5789 -0.1086
ψ Sagittarii	4.9	1.72	3.8	25 24.3	2	51.1	+8 36.8	-0.3614	0.5781 -0.1111
χ Sagittarii	4.9	1.66	3.6	24 40.5	6	46.8	-11 36.6	-0.6550	0.5748 -0.1215
49 Sagittarii	5.5	1.64	3.7	24 7.8	6	52.8	-11 30.9	-1.2032	0.5747 -0.1217
51 Sagittarii	5.8	+1.61	-3.0	-24 54.4	11	9.6	-7 23.9	+0.1391	0.5711 +0.1326
<i>h</i> Sagittarii	4.7	1.61	2.9	25 4.4	11	26.0	-7 8.1	+0.3469	0.5708 -0.1333
53 Sagittarii	6.3	1.57	3.2	23 37.4	12	44.5	-5 52.5	-0.9722	0.5697 -0.1365
274 B. Sagittarii	6.1	1.57	3.2	23 37.5	12	51.7	-5 45.6	-0.9531	0.5696 -0.1368
308 B. Sagittarii	6.3	1.50	2.5	24 9.2	18	45.7	-0 4.8	+0.4410	0.5644 -0.1508
329 B. Sagittarii	6.1	+1.45	-2.4	-22 58.3	21	46.2	+2 49.0	-0.3183	0.5617 +0.1575
336 B. Sagittarii	6.5	1.44	2.4	22 50.1	22	46.2	+3 46.8	-0.3022	0.5608 -0.1597
4 Capricorni	5.7	1.36	2.0	22 4.4	7	4 55.1	+9 42.4	-0.0706	0.5552 -0.1727
19 Capricorni	5.7	1.13	1.6	18 14.8	21	22.8	+1 35.9	-0.9711	0.5407 -0.2026
20 Capricorni	6.2	1.12	1.0	19 21.9	23	34.5	+3 43.2	+0.6506	0.5388 -0.2061
21 Capricorni	6.5	+1.09	-1.4	-17 51.8	8	0 10.6	+4 18.0	-0.8010	0.5383 +0.2070
θ Capricorni	4.2	1.07	1.3	17 34.3	2	32.1	+6 34.8	-0.6154	0.5363 -0.2105
114 B. Capricorni	6.1	1.02	0.9	17 41.8	6	50.2	+10 44.4	+0.4355	0.5328 -0.2167
URANUS	6.0	...	...	16 58.8	6	51.7	+10 45.9	-0.3138	0.5314 -0.2164
31 Capricorni	6.3	1.01	0.7	17 49.2	8	19.6	-11 49.0	+0.8888	0.5316 -0.2187
1 Capricorni	4.3	+0.98	-0.7	-17 11.8	10	13.8	-9 58.5	+0.6527	0.5302 +0.2212
42 Capricorni	5.1	0.86	0.8	14 25.6	19	36.2	-0 54.0	-0.1440	0.5232 -0.2324
44 Capricorni	6.0	0.86	0.6	14 47.3	20	20.6	-0 11.1	+0.4110	0.5226 -0.2332
45 Capricorni	5.8	0.86	0.4	15 8.4	20	48.3	+0 15.8	+0.8901	0.5223 -0.2337
151 B. Capricorni	6.1	0.82	0.8	13 7.2	23	37.3	+2 59.6	-0.5875	0.5204 -0.2366
μ Capricorni	5.2	+0.82	-0.4	-13 57.2	9	1 23.6	+4 42.5	+0.7166	0.5192 +0.2383
<i>e</i> Aquarii	5.4	0.72	0.2	11 59.0	10	9.0	-10 48.0	+0.7474	0.5138 -0.2458
150 B. Aquarii	6.0	0.66	0.7	9 27.8	13	22.0	-7 40.8	-1.1422	0.5119 -0.2483
167 G. Aquarii	6.3	0.57	0.1	8 20.4	10	0 30.7	+3 8.3	+0.4613	0.5064 -0.2550
67 Aquarii	6.4	0.55	0.1	7 24.5	3	4.8	+5 37.9	+0.1205	0.5053 -0.2563
252 B. Aquarii	5.8	+0.49	-0.1	-5 26.4	9	24.7	+11 46.8	-0.3605	0.5028 +0.2587
197 G. Aquarii	6.3	0.48	0.0	5 15.9	10	32.2	-11 7.6	-0.2590	0.5024 -0.2591
263 B. Aquarii	6.1	0.46	+0.2	5 10.1	12	48.0	-8 55.6	+0.2249	0.5017 -0.2598
293 B. Aquarii	5.5	0.41	0.4	3 57.6	20	20.9	-1 35.6	+0.8916	0.4995 -0.2614
13 Piscium	6.4	0.34	0.7	1 33.3	11	5 14.0	+7 2.6	+0.6211	0.4976 -0.2619
14 Piscium	5.9	+0.34	+0.8	-1 43.0	6	25.2	+8 11.8	+1.1073	0.4974 +0.2619
λ Piscium	4.6	0.29	0.6	+1 18.7	10	44.1	-11 36.2	-1.0436	0.4968 -0.2616
21 Piscium	5.6	0.28	1.0	0 36.3	14	46.7	-7 40.7	+0.7802	0.4965 -0.2611
22 Piscium	5.8	0.26	0.8	2 27.5	16	8.9	-6 20.7	-0.8752	0.4963 -0.2609
25 Piscium	6.2	+0.26	+1.0	+1 37.1	16	45.5	-5 45.1	+0.1958	0.4962 +0.2603

NEW MOON.

[Eph 15]

ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

APRIL.

THE STAR'S					AT CONJUNCTION IN R. A.							Limiting Parallels.	
Name.	Mag.	Red'ns from 1915.0.		Apparent Declination.	Washington Mean Time.			Hour Angle, H .	Y	x'	y'	N.	S.
		$\Delta\alpha$	$\Delta\delta$		d	h	m						
tis (mean)	4.6	+0.16	+7.2	+21 0.2	15	18	43.0	- 6 37.2	+0.9826	0.5236	+0.1644	+90	+23
tis	5.8	0.22	8.3	24 25.6	16	6	50.7	+ 5 7.5	-0.9587	0.5292	0.1419	-11	-66
i	5.9	0.26	8.4	24 10.9	11	41.6	+ 9 49.1	-0.0233	0.5313	0.1323	+42	-28	
i	6.1	0.28	8.7	25 3.5	14	41.0	-11 17.3	-0.6095	0.5326	0.1262	+10	-60	
i	5.4	0.30	8.6	24 1.5	16	36.3	- 9 25.8	+0.7769	0.5334	0.1223	+90	+14	
i	3.8	+0.31	+8.5	+23 51.0	16	38.5	- 9 23.6	+0.9770	0.5334	+0.1222	+90	+27	
i	5.6	0.30	8.7	24 34.6	16	45.9	- 9 16.4	+0.1846	0.5335	0.1219	+55	-17	
i	4.3	0.31	8.6	24 12.2	16	47.6	- 9 14.7	+0.6012	0.5335	0.1219	+86	+ 5	
i	4.1	0.31	8.6	24 6.3	17	5.2	- 8 57.8	+0.7465	0.5336	0.1213	+90	+13	
i	5.8	0.31	8.6	24 17.5	17	7.3	- 8 55.7	+0.5430	0.5336	0.1212	+81	+ 2	
i	6.5	+0.31	+8.6	+24 16.0	17	11.3	- 8 51.9	+0.5804	0.5337	+0.1210	+84	+ 4	
i	4.3	0.31	8.5	23 41.2	17	19.7	- 8 43.8	+1.2411	0.5337	0.1208	+84	+50	
i	3.0	0.32	8.6	23 50.7	17	52.3	- 8 12.2	+1.1299	0.5340	0.1166	+90	+39	
i	3.7	0.32	8.6	23 47.8	18	39.8	- 7 26.2	+1.2781	0.5343	0.1180	+76	+56	
i	5.2	0.32	8.6	23 52.8	18	40.4	- 7 25.6	+1.1865	0.5343	0.1180	+90	+44	
i	5.3	+0.32	+8.8	+25 19.6	19	10.8	- 6 56.2	-0.3610	0.5345	+0.1169	+23	-45	
i	5.6	0.41	9.3	26 15.8	17	44.6	+ 2 18.7	-0.3820	0.5382	0.0962	+22	-44	
i	5.0	0.46	9.6	27 9.1	9	7.6	+ 6 33.0	-0.9689	0.5397	0.0863	-15	-63	
i	5.3	0.47	9.2	25 25.9	10	10.8	+ 7 34.1	+1.0303	0.5401	0.0839	+90	+35	
gæ	6.0	0.63	9.9	27 45.5	23	55.3	- 3 9.3	-0.6198	0.5440	0.0517	+ 8	-56	
gæ	6.5	+0.70	+9.8	+27 34.9	18	5 16.8	+ 2 1.3	-0.1794	0.5452	+0.0388	+33	-27	
gæ	6.0	0.72	9.8	27 55.6	7	34.7	+ 4 14.4	-0.4803	0.5456	0.0332	+16	-45	
i	6.4	0.79	9.8	27 52.5	12	38.2	+ 9 7.5	-0.2856	0.5464	0.0208	+27	-32	
i	1.8	0.83	9.8	28 32.4	15	0.1	+11 24.6	-0.9793	0.5467	0.0150	-16	-61	
gæ	6.5	0.88	9.4	27 36.6	19	20.2	- 8 24.3	+0.0913	0.5471	0.0042	+49	- 9	
gæ	5.7	+0.89	+9.2	+26 52.5	19	53.7	- 7 52.0	+0.9073	0.5471	+0.0028	+90	+34	
i	5.6	0.98	9.4	27 56.8	19	2 3.3	- 1 55.1	-0.3077	0.5475	-0.0125	+26	-32	
i	4.6	0.99	9.2	27 35.7	3	7.0	-0.53.6	+0.0649	0.5475	0.0151	+47	-12	
i	6.1	1.04	9.0	27 34.3	6	33.0	+ 2 25.3	+0.0252	0.5475	0.0237	+45	-15	
gæ	5.1	1.26	8.3	28 5.5	21	50.2	- 6 49.2	-1.1963	0.5464	0.0614	-38	-62	
inorum	5.7	+1.36	+6.8	+25 29.1	20	6 55.6	+ 1 57.4	+1.0077	0.5440	-0.0832	+90	+33	
inorum	6.2	1.39	6.0	26 11.7	8	29.4	+ 3 28.0	+0.0959	0.5446	0.0869	+49	-17	
inorum	6.3	1.39	6.8	26 1.9	8	47.4	+ 3 45.4	+0.2484	0.5445	0.0876	+59	-10	
inorum	6.1	1.48	5.8	25 2.1	15	41.9	+10 25.8	+0.6762	0.5430	0.1037	+90	+11	
inorum	5.1	1.53	5.6	25 13.0	19	41.4	- 9 42.9	+0.0456	0.5420	0.1129	+46	-22	
inorum	6.3	+1.62	+4.6	+24 33.2	21	2 26.7	- 3 11.3	-0.0453	0.5403	-0.1279	+41	-29	
inorum	6.0	1.62	4.6	24 25.0	2	53.2	- 2 45.7	+0.0453	0.5402	0.1289	+46	-24	
inorum	6.3	1.61	4.1	23 13.0	3	43.3	- 1 57.3	+1.2402	0.5399	0.1307	+84	+49	
inorum	3.7	1.65	4.4	24 36.2	5	17.7	-0.26.0	-0.4742	0.5395	0.1341	+17	-53	
inorum	6.3	1.66	3.8	23 21.2	7	12.4	+ 1 24.8	+0.6225	0.5389	0.1382	+88	+ 4	
ri	6.4	+1.74	+3.3	+23 49.1	12	57.3	+ 6 58.1	-0.7107	0.5373	-0.1503	+ 4	-66	
ri	6.2	1.76	2.7	22 52.8	15	25.5	+ 9 21.4	-0.0732	0.5366	0.1554	+39	-33	
ri	5.5	1.75	2.2	21 49.8	16	7.1	+10 1.6	+0.9523	0.5363	0.1568	+90	+22	
ri	6.4	1.81	2.5	23 23.7	18	51.6	-11 19.3	-1.1740	0.5355	0.1623	-30	-67	
ri	6.0	1.82	1.3	21 1.0	22	0.1	- 8 17.0	+0.8687	0.5346	0.1685	+90	+15	
ri	5.5	+1.88	+0.5	+20 43.8	22	3 48.9	- 2 39.6	+0.1623	0.5329	-0.1796	+53	-24	
ri	6.5	1.92	0.0	20 18.5	7	18.8	+ 0 43.4	-0.0247	0.5319	0.1860	+42	-34	
ri	6.5	1.92	0.0	20 16.3	7	21.3	+ 0 45.9	+0.0066	0.5319	0.1861	+44	-32	
ri	6.5	1.91	-0.2	19 58.3	7	26.5	+ 0 50.9	+0.3128	0.5319	0.1862	+62	-17	
ri	6.3	1.91	0.2	19 50.8	7	29.0	+ 0 53.3	+0.4390	0.5319	0.1863	+71	-11	
ri	6.1	+1.96	-1.1	+19 9.0	12	22.6	+ 5 37.4	+0.2490	0.5305	-0.1950	+58	-21	
ri	6.4	2.06	4.0	15 43.9	23	3 1.6	- 4 11.9	+0.8415	0.5270	0.2188	+90	+ 7	
is	6.3	2.10	3.8	16 57.1	5	5.0	- 2 12.5	-0.9018	0.5266	0.2219	- 6	-73	
is	6.2	2.12	5.2	14 45.5	10	6.3	+ 2 39.3	+0.2808	0.5258	0.2290	+59	-24	
is	6.5	2.13	5.3	14 43.8	11	8.6	+ 3 39.6	+0.0710	0.5256	0.2305	+47	-34	
s	5.6	+2.15	-5.7	+14 24.6	13	54.0	+ 6 20.7	-0.2350	0.5252	-0.2342	+31	-1	

ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

APRIL.

THE STAR'S					AT CONJUNCTION IN R. A.							Limiting Parallels
Name.	Mag.	Red'ns from 1915.0.		Apparent Declination.	Washington Mean Time.	Hour Angle, H		Y	x'	y'	N. S.	
		$\Delta\alpha$	$\Delta\delta$			h	m					
<i>v</i> Leonis	5.0	+2.20	-7.1	+12 50.9	23 20 58.8	-10 48.9	+0.2852	0.5244	-0.2432	+29 55		
A Leonis	4.6	2.20	8.4	10 24.7	24 1 43.4	-6 13.1	+1.0895	0.5241	-0.2486	+90 19		
α Leonis	1.3	2.23	7.8	12 22.9	1 56.6	-6 0.4	-1.0164	0.5240	-0.2489	-12 76		
44 Leonis	5.9	2.27	9.8	9 12.9	10 11.8	+1 59.3	+0.1848	0.5240	-0.2574	+54 32		
45 Leonis	5.8	2.29	9.6	10 11.6	11 21.6	+3 6.9	-1.1285	0.5240	-0.2585	-20 88		
ρ Leonis	3.8	+2.31	-10.0	+9 44.5	13 53.0	+5 33.5	-1.3144	0.5240	-0.2608	-37 80		
48 Leonis	5.2	2.28	10.8	7 23.3	14 52.4	+6 31.0	+0.8576	0.5242	-0.2617	+90 3		
49 Leonis	5.7	2.31	10.3	9 5.2	14 58.6	+6 37.1	-0.9230	0.5242	-0.2618	-6 81		
37 Sextantis	6.3	2.32	11.6	6 49.1	20 22.7	+11 50.9	-0.0097	0.5247	-0.2662	+43 41		
56 Leonis	6.1	2.36	12.1	6 38.2	25 1 12.7	-7 28.3	-1.1158	0.5253	-0.2696	-18 83		
d Leonis	5.0	+2.35	-13.0	+4 4.2	3 25.5	-5 19.6	+0.9144	0.5258	-0.2709	+90 5		
75 Leonis	5.4	2.40	14.3	2 28.5	11 31.2	+2 30.6	+0.3283	0.5276	-0.2752	+62 26		
76 Leonis	6.0	2.40	14.4	2 6.8	12 18.5	+3 16.4	+0.4788	0.5278	-0.2757	+72 10		
79 Leonis	5.5	2.42	14.7	+1 52.2	14 46.3	+5 39.5	+0.0446	0.5286	-0.2765	+46 41		
v Leonis	4.5	2.44	15.7	-0 21.5	20 57.2	+11 38.5	+0.5878	0.5306	-0.2783	+80 13		
78 B. Virginis	6.5	+2.53	-17.9	-5 15.1	26 14 29.6	+4 36.6	+0.6128	0.5388	-0.2781	+81 12		
χ Virginis	4.8	2.61	18.8	7 32.0	27 1 54.4	-8 21.8	-0.2634	0.5458	-0.2735	-28 58		
ψ Virginis	5.0	2.65	19.3	9 5.0	8 39.3	-1 50.9	-0.5547	0.5505	-0.2690	+13 78		
49 Virginis	5.2	2.69	10.5	10 17.5	14 36.4	+3 53.7	-0.9421	0.5549	-0.2638	-9 90		
i Virginis	5.7	2.74	19.8	12 16.3	22 43.4	+11 43.2	-1.0912	0.5614	-0.2549	-21 90		
75 Virginis	5.6	+2.76	-19.9	-14 55.9	28 1 18.9	-9 47.0	+0.8742	0.5636	-0.2516	+75 4		
83 Virginis	5.6	2.80	19.9	15 45.4	6 11.7	-5 5.0	+0.4751	0.5676	-0.2447	+64 18		
85 Virginis	6.1	2.80	19.8	15 20.8	6 39.2	-4 38.5	-0.0413	0.5680	-0.2440	+35 46		
43 H. Virginis	5.5	2.88	19.4	17 48.6	18 49.5	+7 4.1	-0.4099	0.5786	-0.2231	+11 73		
231 G. Virginis	6.4	2.88	19.4	18 11.8	19 29.2	+7 42.3	-0.2385	0.5793	-0.2218	+22 57		
236 G. Virginis	5.7	+2.89	-10.4	-18 19.7	20 7.1	+8 18.7	-0.2489	0.5797	-0.2206	+22 58		
9 G. Libræ	6.5	2.94	18.9	20 4.3	29 2 31.2	-9 32.2	+0.0904	0.5852	-0.2072	-38 38		
17 G. Libræ	6.4	2.96	18.6	20 40.3	6 56.1	-5 17.9	-0.0685	0.5889	-0.1971	+28 47		
18 G. Libræ	6.1	2.96	18.5	20 58.4	7 20.2	-4 54.7	+0.0022	0.5892	-0.1961	+32 43		
43 B. Libræ	5.7	3.00	18.8	21 2.3	11 14.3	-1 10.1	-0.6814	0.5923	-0.1866	-4 90		
47 G. Libræ	6.1	+3.00	-17.8	-21 42.4	14 41.6	+2 8.7	-0.6572	0.5950	-0.1778	-4 90		
64 G. Libræ	5.8	3.02	17.4	22 5.4	18 26.6	+5 44.4	-0.9300	0.5978	-0.1678	-21 90		
153 B. Libræ	6.3	3.06	16.4	24 12.4	30 0 40.6	+11 42.7	+0.1498	0.6021	-0.1502	+35 35		
42 Libræ	5.0	3.06	16.2	23 32.8	3 19.2	-9 45.4	-0.8826	0.6037	-0.1424	-21 90		
b Scorpïi	4.7	3.09	15.4	25 29.9	7 13.4	-6 1.1	+0.4961	0.6059	-0.1306	+53 16		
A Scorpïi	4.6	+3.09	-15.3	-25 4.7	8 11.5	-5 5.6	-0.0403	0.6064	-0.1276	+23 46		
31 B. Scorpïi	5.4	3.08	15.3	24 17.1	8 18.3	-4 59.0	-0.8326	0.6065	-0.1273	-19 99		
3 Scorpïi	5.9	3.09	15.2	24 59.8	8 34.4	-4 43.6	-0.1689	0.6066	-0.1264	+16 54		
4 Scorpïi	5.7	3.10	15.1	26 1.2	8 52.2	-4 26.5	+0.7975	0.6068	-0.1255	+64 2		
40 B. Scorpïi	5.4	3.08	15.1	24 35.5	10 0.5	-3 21.2	-0.7450	0.6074	-0.1219	-14 90		
π Scorpïi	3.0	+3.10	-14.9	-25 52.5	10 5.5	-3 16.4	+0.5935	0.6074	-0.1217	+53 15		
48 B. Scorpïi	4.9	3.10	14.7	25 38.0	11 43.8	-1 42.4	+0.0719	0.6081	-0.1165	+28 39		
50 B. Scorpïi	6.4	3.08	14.8	24 29.8	11 56.9	-1 29.8	-1.0683	0.6082	-0.1158	-36 00		
65 B. Scorpïi	5.5	3.11	14.4	26 6.2	13 27.1	-0 3.5	+0.3374	0.6089	-0.1110	+41 25		
85 B. Scorpïi	6.0	3.09	14.1	25 15.9	15 54.8	+2 17.8	-0.7482	0.6099	-0.1030	-16 90		
σ Scorpïi	3.1	+3.09	-13.7	-25 23.6	18 10.9	+4 28.0	-0.8484	0.6107	-0.0956	-23 90		
α Scorpïi	1.2	3.10	13.1	26 14.9	21 7.5	+7 17.0	-0.2761	0.6116	-0.0858	+7 00		
116 B. Scorpïi	6.2	+3.11	-12.9	-26 21.4	21 50.0	+7 57.6	-0.2287	0.6117	-0.0834	+9 57		

MAY.

134 B. Scorpïi	6.4	+3.11	-12.0	-27 18.0	1 2 26.6	-11 37.9	+0.3514	0.6127	-0.0678	+39 24		
118 B. Ophiuchi	6.2	3.07	10.7	26 24.1	10 31.7	-3 54.1	-0.9715	0.6131	-0.0399	-35 90		
95 G. Ophiuchi	6.1	3.08	10.0	27 39.6	12 29.3	-2 1.5	+0.2000	0.6129	-0.0331	+28 31		
36 Oph. (1st star)	5.4	3.04	10.4	26 28.9	13 34.1	-0 59.7	-0.9990	0.6128	-0.0294	-38 90		
43 Ophiuchi	5.4	+3.08	-9.2	-28 3.8	16 23.6	+1 42.4	+0.4964	0.6124	-0.0196	+44 15		

(Eph 15)

ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

MAY.

THE STAR'S					AT CONJUNCTION IN R. A.							Limiting Par- allels.	
Name.	Mag.	Red'ns from 1915.0.		Apparent Declina- tion.	Washington Mean Time.	Hour Angle, H		Y	x'	y'	N.	S.	
		$\Delta\alpha$	$\Delta\delta$			d h m	h m						
3. Ophiuchi	6.3	+3.03	-7.8	-27 50.8	d 1 23 33.1	+ 8 33.2	+0.2299	0.6104	+0.0051	+27-30			
Sagittarii (var.)	4.4	3.02	7.5	27 48.1	2 1 5.4	+10 1.5	+0.1975	0.6099	0.0103	+25-32			
3. Sagittarii	6.2	2.99	7.7	26 56.9	1 25.7	+10 20.8	-0.6469	0.6098	0.0115	-18-90			
3. Sagittarii	5.7	3.00	6.8	28 3.2	4 23.3	-10 49.3	+0.5020	0.6085	0.0216	+44-15			
B. Scorpii	5.8	3.01	6.4	28 45.1	5 53.0	-10 9.1	+1.2130	0.6082	0.0239	+61+41			
B. Sagittarii	4.7	+2.97	-5.8	-28 28.1	8 31.3	-6 51.9	+1.0348	0.6064	+0.0355	+62+21			
3. Sagittarii	6.3	2.94	5.3	28 19.1	11 55.7	-3 36.3	+1.0261	0.6045	0.0466	+62+20			
B. Sagittarii	4.7	2.91	5.5	27 4.5	12 11.6	-3 21.1	-0.2025	0.6043	0.0476	+8-56			
3. Sagittarii	6.1	2.93	4.8	28 28.2	13 37.6	-1 58.8	+1.2637	0.6034	0.0522	+62+52			
3. Sagittarii	6.2	2.86	4.9	26 41.2	15 46.1	0 4.3	-0.4005	0.6020	0.0592	-1-69			
3. Sagittarii	6.3	+2.87	-4.8	-26 48.6	15 54.4	+0 12.3	-0.2694	0.6019	+0.0596	+5-60			
B. Sagittarii	6.5	2.86	4.8	26 38.3	16 13.3	+0 30.4	-0.4228	0.6017	0.0606	-2-71			
Sagittarii	3.3	2.81	3.5	27 4.8	22 27.0	+6 28.4	+0.4588	0.5971	0.0800	+46-18			
Sagittarii	2.1	2.75	3.0	26 24.3	3 2 5.7	+9 58.1	+0.0917	0.5941	0.0910	+27-38			
B. Sagittarii	6.4	2.70	3.2	24 59.5	3 17.3	+11 6.7	-1.2202	0.5931	0.0946	-51-85			
G. Sagittarii	6.4	+2.70	-3.0	-25 3.7	4 4.6	+11 52.2	-1.0747	0.5924	+0.0969	-37-90			
B. Sagittarii	5.8	2.68	2.9	24 57.9	4 51.8	-11 22.6	-1.0949	0.5918	0.0992	-39-90			
B. Sagittarii	6.1	2.66	2.6	24 47.5	7 5.2	-9 14.6	-1.0444	0.5897	0.1056	-34-90			
B. Sagittarii	5.9	2.66	1.8	26 3.0	8 59.8	-7 24.6	+0.4340	0.5880	0.1110	+47-19			
Sagittarii	4.9	2.64	1.9	25 24.3	9 54.2	-6 32.5	-0.1174	0.5871	0.1135	+18-50			
B. Sagittarii	6.1	+2.62	-2.2	-24 19.5	9 55.3	-6 31.4	-1.2067	0.5871	+0.1135	-48-88			
Sagittarii	4.9	2.58	1.4	24 40.5	13 43.4	-2 52.3	-0.4034	0.5835	0.1238	+5-69			
Sagittarii	5.5	2.56	1.6	24 7.8	13 49.2	-2 46.8	-0.9436	0.5834	0.1241	-26-90			
Sagittarii	5.8	2.53	0.6	24 54.4	17 59.2	+1 13.4	+0.3831	0.5794	0.1350	+47-22			
Sagittarii	4.7	2.53	0.5	25 4.3	18 15.2	+1 28.7	+0.5882	0.5791	0.1356	+59-11			
Sagittarii	6.3	+2.48	-0.7	-23 37.3	19 31.6	+2 42.1	-0.7116	0.5778	+0.1388	-10-90			
B. Sagittarii	6.1	2.48	-0.7	23 37.5	19 38.6	+2 48.8	-0.6926	0.5777	0.1391	-9-90			
B. Sagittarii	6.3	2.42	+0.3	24 9.2	4 1 23.8	+8 20.8	+0.6868	0.5718	0.1530	+65-5			
B. Sagittarii	6.1	2.36	0.5	22 58.3	4 20.1	+11 10.4	-0.0607	0.5688	0.1597	+26-47			
B. Sagittarii	6.5	2.34	0.7	22 50.1	5 18.6	-11 53.2	-0.0441	0.5678	0.1619	+27-46			
Capricorni	5.7	+2.26	+1.3	-22 4.4	11 19.4	-6 5.8	+0.1880	0.5615	+0.1747	+40-33			
B. Capricorni	6.4	2.01	2.0	18 21.0	5 1 1.5	+7 7.0	-1.0844	0.5475	0.2000	-27-90			
Capricorni	5.7	1.98	2.3	18 14.7	3 28.7	+9 29.2	-0.6984	0.5451	0.2039	-1-90			
Capricorni	6.2	1.98	3.0	19 21.9	5 38.2	+11 34.2	+0.9081	0.5430	0.2073	+71+7			
Capricorni	6.5	1.94	2.5	17 51.7	6 13.8	-11 51.4	-0.5300	0.5424	0.2082	+8-77			
Capricorni	4.2	+1.91	+2.7	-17 34.2	8 33.2	-9 36.7	-0.3461	0.5402	+0.2117	+18-64			
B. Capricorni	6.1	1.86	3.3	17 41.8	12 47.7	-5 30.7	+0.6955	0.5362	0.2175	+72-6			
URANUS	6.0	...	...	16 48.5	14 0.1	+4 20.6	+0.0329	0.5346	0.2190	+38-42		
Capricorni	6.3	1.85	3.5	17 49.1	14 15.9	-4 5.4	+1.1451	0.5348	0.2195	+72+24			
Capricorni	4.3	1.81	3.5	17 11.8	16 8.7	-2 16.2	+0.9109	0.5331	0.2219	+73+7			
Capricorni	5.1	+1.66	+3.5	-14 25.6	6 1 25.1	+6 42.2	+0.1179	0.5252	+0.2325	+45-37			
Capricorni	6.0	1.66	3.8	14 47.3	2 9.1	+7 24.9	+0.6690	0.5246	0.2333	+75-8			
Capricorni	5.8	1.66	4.0	15 8.3	2 36.5	+7 51.4	+1.1448	0.5242	0.2337	+75+22			
B. Capricorni	6.1	1.60	3.6	13 7.1	5 24.1	+10 33.8	-0.3247	0.5220	0.2365	+23-62			
Capricorni	5.2	1.60	4.0	13 57.1	7 9.5	-11 44.1	+0.9709	0.5207	0.2381	+76+10			
Aquarii	5.4	+1.47	+4.2	-11 58.9	15 51.6	-3 18.0	+0.9968	0.5145	+0.2452	+78+11			
B. Aquarii	6.0	1.41	3.7	9 27.8	19 3.7	-0 11.7	-0.8872	0.5124	0.2474	+5-90			
G. Aquarii	6.3	1.28	4.3	8 20.3	7 6 10.5	+10 35.4	+0.6997	0.5060	0.2535	+82-7			
Aquarii	6.4	1.25	4.2	7 24.4	8 44.4	-10 55.2	+0.3570	0.5048	0.2546	+63-25			
B. Aquarii	5.8	1.17	4.1	5 26.4	15 4.2	-4 46.3	-0.1310	0.5019	0.2568	+36-50			
G. Aquarii	6.3	+1.15	+4.2	-5 15.8	16 11.7	-3 40.7	-0.0312	0.5015	+0.2571	+41-45			
B. Aquarii	6.1	1.13	4.3	5 10.0	18 27.6	-1 28.7	+0.4490	0.5006	0.2576	+60-20			
B. Aquarii	5.5	1.05	4.6	3 57.5	8 2 1.3	+5 52.2	+1.1042	0.4980	0.2589	+86+17			
Piscium	6.4	0.96	4.5	1 33.2	10 55.9	-9 28.1	+0.8197	0.4959	0.2592	+88-1			
Piscium	5.9	0.95	4.6	1 42.9	12 7.4	-8 18.6	+1.3040	0.4957	0.2592	+88+35			
Piscium	4.6	+0.88	+4.0	+1 18.8	16 27.6	-4 5.6	-0.8553	0.4949	+0.2588	-2-89			

ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

MAY.

THE STAR'S					AT CONJUNCTION IN R. A.					Limit- ing Par- allels.	
Name.	Mag.	Red'ns from 1915.0.		Apparent Declina- tion.	Washington Mean Time.	Hour Angle, H	Y	x'	y'		N. S.
		$\Delta\alpha$	$\Delta\delta$								
		s	"	'	d h m	h m					
21 Piscium	5.6	+0.86	4.6	+0 36.3	8 20 31.0	0 8.9	+0.9620	0.4945	+0.2582	+90+7	
22 Piscium	5.8	0.84	4.1	2 27.5	21 53.6	+1 11.4	-0.6973	0.4944	0.2579	+7-58	
25 Piscium	6.2	0.84	4.4	1 37.2	22 30.3	+1 47.1	+0.3734	0.4944	0.2578	+65-24	
51 Piscium	5.6	0.66	4.7	6 29.3	9 20 7.0	+1 12.0	+0.5579	0.4950	0.2496	+78-14	
136 B. Piscium	6.5	0.61	4.4	8 53.6	10 05.4	+3 29.5	-0.8816	0.4958	0.2468	-3-81	
7 Piscium	3.7	+0.44	5.1	+14 54.6	4 3.3	+5 50.7	-1.0964	0.5034	+0.2245	-19-75	
101 Piscium	6.2	0.44	5.3	14 13.7	6 20.2	+8 3.6	+0.1653	0.5043	0.2222	+53-30	
105 Piscium	6.1	0.42	5.2	15 58.6	8 23.1	+10 3.0	-1.3140	0.5051	0.2199	-41-74	
NEW MOON.											
38 B. Aurigæ	6.5	+0.59	8.4	+27 34.8	15 11 25.2	+9 57.2	-0.3454	0.5468	+0.0371	+24-37	
47 B. Aurigæ	6.0	0.61	8.4	27 55.6	13 43.1	-11 49.6	-0.6509	0.5472	0.0315	+6-57	
354 B. Tauri	6.4	0.65	8.4	27 52.5	18 46.7	-6 56.5	-0.4648	0.5479	0.0191	+17-43	
β Tauri	1.8	0.68	8.4	28 32.3	21 8.7	+4 39.3	-1.1640	0.5482	0.0133	-35-61	
107 B. Aurigæ	6.5	0.71	8.2	27 36.6	16 1 29.1	+0 28.0	-0.0984	0.5484	0.0026	+38-20	
112 B. Aurigæ	5.7	+0.71	8.1	+26 52.5	2 2.7	+0 4.5	+0.7186	0.5485	+0.0012	+90+23	
406 B. Tauri	5.6	0.77	8.2	27 56.7	8 13.0	+6 2.0	-0.5094	0.5486	-0.0141	+14-45	
136 Tauri	4.6	0.78	8.0	27 35.7	9 16.9	+7 3.7	-0.1375	0.5486	0.0167	+35-23	
415 B. Tauri	6.1	0.82	8.0	27 34.3	12 43.4	+10 23.1	-0.1828	0.5484	0.0253	+33-26	
37 Geminorum	5.7	1.06	6.3	25 29.1	17 13 13.4	+10 2.8	+0.7689	0.5445	0.0843	+90+18	
39 Geminorum	6.2	+1.08	6.4	+26 11.7	14 47.9	+11 34.0	-0.1494	0.5440	-0.0880	+35-30	
40 Geminorum	6.3	1.09	6.3	26 1.9	15 6.1	+11 51.7	+0.0035	0.5439	0.0887	+44-22	
52 Geminorum	6.1	1.16	5.6	25 2.1	22 4.3	-5 24.3	+0.4249	0.5419	0.1046	+71-2	
A Geminorum	5.1	1.20	5.4	25 13.0	18 2.6	-1 30.6	-0.2140	0.5406	0.1136	+31-36	
176 B. Geminorum	6.3	1.27	4.6	24 33.2	8 56.1	+5 5.7	-0.3133	0.5383	0.1284	+26-43	
181 B. Geminorum	6.0	+1.28	4.6	+24 25.0	9 23.0	+5 31.6	-0.2227	0.5382	-0.1294	+31-38	
187 B. Geminorum	6.3	1.27	4.2	23 13.0	10 13.7	+6 20.7	+0.9795	0.5379	0.1312	+90+26	
κ Geminorum	3.7	1.30	4.4	24 36.2	11 49.3	+7 53.1	-0.7483	0.5373	0.1345	+1-65	
82 Geminorum	6.3	1.31	3.9	23 21.2	13 45.5	+9 45.5	-0.3541	0.5366	0.1385	+65-10	
5 B. Cancri	6.4	1.38	3.5	23 49.1	19 35.4	-8 36.2	-0.9950	0.5345	0.1503	-15-66	
9 Cancri	6.2	+1.40	3.0	+22 52.8	22 5.8	-6 10.7	-0.3547	0.5335	-0.1552	+24-48	
μ Cancri	5.5	1.40	2.6	21 49.8	22 48.1	-5 29.8	+0.6785	0.5333	0.1566	+90+5	
49 B. Cancri	6.0	1.45	1.8	21 1.0	14 47.0	+0 17.5	+0.5897	0.5310	0.1680	+84-1	
79 Cancri	5.5	1.51	1.2	20 43.9	10 42.2	+6 1.3	-0.1270	0.5288	0.1787	+37-39	
39 Cancri	6.5	1.55	0.8	20 18.5	14 16.2	+9 28.4	-0.3182	0.5275	0.1849	+26-59	
40 Cancri	6.5	+1.55	0.7	+20 16.3	14 18.7	+9 30.9	-0.2866	0.5275	-0.1850	+28-48	
102 B. Cancri	6.5	1.54	0.6	19 58.3	14 24.0	+9 36.0	+0.0226	0.5274	0.1851	+45-32	
e Cancri	6.3	1.54	0.6	19 50.8	14 26.6	+9 38.5	+0.1490	0.5274	0.1852	+52-25	
δ Cancri	4.2	1.55	-0.2	18 20.8	16 30.4	+11 38.3	+1.2538	0.5267	0.1887	+88-42	
139 B. Cancri	6.1	1.59	0.1	19 9.0	19 26.3	-9 31.3	-0.0445	0.5257	0.1935	+41-36	
X Cancri (var.)	6.2	+1.59	-0.9	+17 33.3	21 42.6	-7 19.3	+1.2303	0.5249	-0.1972	+90+38	
227 B. Cancri	6.4	1.70	2.8	15 43.9	10 25.7	+4 59.9	+0.5504	0.5210	0.2163	+79-9	
12 B. Leonis	6.3	1.74	2.6	16 57.1	12 32.1	+7 2.4	-1.2140	0.5205	0.2192	-30-73	
7 Leonis	6.2	1.77	3.9	14 45.5	17 41.2	-11 58.1	-0.0173	0.5192	0.2261	+43-39	
11 Leonis	6.5	1.78	4.0	14 43.9	18 45.2	-10 56.0	-0.2296	0.5190	0.2274	+31-59	
ψ Leonis	5.6	+1.81	-4.4	+14 24.6	21 35.0	-8 10.6	-0.5392	0.5184	-0.2310	+15-69	
ν Leonis	5.0	1.86	5.7	12 50.9	4 51.6	-1 8.3	-0.5886	0.5172	0.2394	+13-73	
A Leonis	4.6	1.88	7.1	10 24.8	9 44.4	+3 35.6	+0.8065	0.5166	0.2446	+90+1	
α Leonis	1.3	1.90	6.4	12 22.9	9 58.0	+3 48.7	-1.3278	0.5166	0.2448	-40-78	
44 Leonis	5.9	1.96	8.4	9 12.9	18 27.9	-11 56.9	-0.1053	0.5161	0.2529	+38-47	
48 Leonis	5.2	+1.98	-9.4	+7 23.3	23 16.0	-7 16.7	+0.5808	0.5162	-0.2569	+80-12	
49 Leonis	5.7	2.00	8.8	9 5.2	23 23.3	-7 10.5	-1.2247	0.5162	0.2570	-28-81	
37 Sextantis	6.3	2.03	10.2	6 49.1	4 57.4	-1 46.5	-0.2933	0.5165	0.2611	+28-59	
56 Leonis	6.1	2.08	10.7	6 38.2	9 56.4	+3 3.4	-1.4097	0.5171	0.2642	-52-73	
d Leonis	5.0	2.08	11.8	4 4.2	12 13.2	+5 16.0	+0.6523	0.5175	0.2656	+80-9	
75 Leonis	5.4	+2.15	-13.0	+2 28.5	20 33.9	-10 38.7	+0.0693	0.5193	-0.2695	+47-39	

ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

MAY.

THE STAR'S					AT CONJUNCTION IN R. A.						Limiting Parallels.	
me.	Mag.	Red'n's from 1915.0.		Apparent Declination.	Washington Mean Time.	Hour Angle, <i>H</i>	<i>Y'</i>	<i>x'</i>	<i>y'</i>	<i>N.</i>	<i>S.</i>	
		$\Delta\alpha$	$\Delta\delta$									
		<i>s</i>	<i>"</i>	<i>°</i> <i>'</i>	<i>d</i> <i>h</i> <i>m</i>	<i>h</i> <i>m</i>				<i>°</i>	<i>°</i>	
mis	6.0	+2.15	-13.2	+ 2 6.8	22 21 22.7	9 51.4	+0.2231	0.5195	-0.2698	+56	-32	
mis	6.3	2.16	13.9	0 35.7	23 33.4	7 44.7	+1.1990	0.5203	0.2706	+90	+24	
mis	5.5	2.18	13.5	+ 1 52.2	23 55.1	7 23.7	-0.2134	0.5202	0.2707	+32	-55	
mis	4.5	2.22	14.7	- 0 21.5	23 6 17.2	1 13.5	+0.3481	0.5224	0.2724	+63	-25	
ginis	6.5	2.38	17.3	5 15.1	24 0 19.7	7 45.2	+0.4089	0.5313	0.2723	+66	-22	
ginis	4.8	+2.50	-18.5	- 7 32.0	12 1.9	3 33.9	-0.4506	0.5389	-0.2678	+19	-70	
ginis	6.0	2.57	19.7	11 11.6	18 55.0	+10 13.1	+1.3927	0.5440	0.2635	+72	+50	
ginis	5.0	2.58	19.1	9 5.0	18 56.2	+10 14.2	-0.7273	0.5440	0.2635	+ 3	-90	
ginis	5.2	2.65	19.5	10 17.5	25 1 0.8	7 53.7	-1.1019	0.5490	0.2586	-21	-90	
ginis	5.7	2.74	20.0	12 16.3	9 16.8	+ 0 4.8	-1.2285	0.5563	0.2500	-33	-90	
ginis	5.6	+2.77	-20.6	-14 55.9	11 54.9	+ 2 37.3	+0.7602	0.5587	-0.2469	+75	- 3	
ginis	5.6	2.84	20.6	15 45.5	16 52.0	+ 7 23.6	+0.3715	0.5634	0.2403	+58	-24	
ginis	6.1	2.84	20.5	15 20.8	17 19.9	+ 7 50.4	-0.1472	0.5639	0.2396	+30	-52	
ginis	5.5	3.00	20.4	17 48.6	26 5 38.4	+ 4 18.8	-0.5426	0.5760	0.2193	+ 7	-78	
ginis	6.4	3.01	20.4	18 11.8	6 18.5	- 3 40.2	-0.3082	0.5766	0.2181	+19	-61	
ginis	5.7	+3.02	-20.4	-18 19.7	6 56.7	- 3 3.5	-0.3168	0.5773	-0.2169	+18	-62	
ræ	6.5	3.11	20.2	20 4.3	13 23.3	+ 3 8.1	+0.0422	0.5837	0.2039	+35	-41	
ræ	6.4	3.17	20.0	20 49.3	17 49.3	+ 7 23.5	-0.1044	0.5880	0.1940	+27	-49	
ræ	6.1	3.17	19.9	20 58.5	18 13.5	+ 7 46.8	-0.0326	0.5884	0.1931	+30	-45	
ræ	5.7	3.25	20.2	21 2.3	22 8.0	+11 31.7	-0.7057	0.5921	0.1838	- 6	-90	
ræ	6.1	+3.27	-19.2	-21 42.4	27 1 35.4	- 9 9.2	-0.6714	0.5954	-0.1751	- 5	-90	
ræ	5.8	3.31	18.7	22 5.4	5 20.1	- 5 33.8	-0.9329	0.5988	0.1653	-22	-90	
ræ	6.3	3.41	18.0	24 12.4	11 32.8	+ 0 23.2	+0.1632	0.6040	0.1479	+35	-34	
ræ	5.0	3.42	17.6	23 32.8	14 10.5	+ 2 54.2	-0.8596	0.6060	0.1402	-20	-90	
rpil	4.7	3.49	17.0	25 29.9	18 3.1	+ 6 36.9	+0.5257	0.6088	0.1285	+54	-14	
rpil	4.6	+3.49	-16.8	-25 4.7	19 0.7	+ 7 31.9	-0.0064	0.6095	-0.1255	+25	-44	
rpil	5.4	3.47	16.8	24 17.1	19 7.5	+ 7 38.4	-0.7956	0.6096	0.1252	-17	-90	
rpil	5.9	3.49	16.7	24 59.8	19 23.5	+ 7 53.8	-0.1335	0.6097	0.1244	+18	-51	
rpil	5.7	3.51	16.7	26 1.2	19 41.1	+ 8 10.6	+0.8300	0.6099	0.1234	+64	+ 4	
rpil	5.4	3.49	16.4	24 35.5	20 48.8	+ 9 15.4	-0.7036	0.6107	0.1199	-12	-90	
rpil	3.0	+3.52	-16.5	-25 52.5	20 53.7	+ 9 20.0	+0.5403	0.6107	-0.1197	+54	-13	
rpil	4.9	3.52	16.2	25 38.0	22 31.1	+10 53.2	+0.1146	0.6117	0.1145	+31	-37	
rpil	6.4	3.51	16.1	24 29.8	22 44.1	+11 5.6	-1.0202	0.6119	0.1138	-33	-90	
rpil	5.5	3.55	15.8	26 6.2	28 0 13.4	-11 29.0	+0.3833	0.6127	0.1090	+44	-22	
rpil	6.0	3.55	15.4	25 16.0	2 39.4	- 9 9.4	-0.6905	0.6141	0.1011	-13	-90	
rpil	3.1	+3.57	-15.0	-25 23.6	4 53.9	- 7 0.8	-0.7840	0.6152	-0.0936	-19	-90	
rpil	1.2	3.60	14.4	26 14.9	7 48.2	+ 4 14.2	-0.2073	0.6165	0.0839	+10	-56	
rpil	6.2	3.61	14.2	26 21.4	8 30.1	+ 3 34.1	-0.1584	0.6168	0.0815	+13	-53	
rpil	6.4	3.66	13.2	27 18.1	13 2.7	+ 0 46.3	+0.4291	0.6183	0.0659	+43	-19	
uichi	6.2	3.67	11.4	26 24.1	20 59.4	+ 8 21.7	-0.8632	0.6198	0.0379	-29	-90	
uichi	6.1	+3.70	-10.9	-27 39.6	22 54.7	+10 11.9	+0.3026	0.6199	-0.0311	+33	-26	
u. (1st star)	5.4	3.66	11.2	26 28.9	23 58.3	+11 12.6	-0.8826	0.6200	0.0273	-30	-90	
uichi	5.4	3.72	9.9	28 3.9	2 44.4	-10 8.7	+0.6053	0.6199	0.0175	+52	- 9	
uichi	6.0	3.67	9.3	26 12.5	5 42.3	+ 7 18.7	-1.2510	0.6195	-0.0069	-61	-76	
uichi	6.3	3.72	8.2	27 50.8	9 44.5	+ 3 27.3	+0.3575	0.6187	+0.0075	+35	-23	
ittarii (var.)	4.4	+3.72	-7.8	-27 48.1	11 14.7	- 2 1.2	-0.3290	0.6182	-0.0128	+34	-25	
ittarii	6.2	3.69	7.8	26 56.9	11 34.5	+14 2.2	-0.5054	0.6181	0.0139	+11	-78	
ittarii	5.7	3.72	6.9	28 3.2	14 27.9	+ 1 3.5	+0.6371	0.6172	0.0241	+55	- 7	
ittarii	4.7	3.72	5.9	28 28.1	18 29.8	+ 4 54.6	+1.1722	0.6154	0.0381	+61	+35	
ittarii	6.3	3.71	5.1	28 19.1	21 48.9	+ 8 5.0	+1.1706	0.6137	0.0495	+62	+35	
ittarii	4.7	+3.67	-5.1	-27 4.5	22 4.4	+ 8 19.8	-0.0421	0.6135	-0.0504	+16	-46	
ittarii	6.2	3.64	4.3	26 41.2	30 1 33.3	+11 39.6	-0.2298	0.6114	0.0621	+ 8	-57	
ittarii	6.3	3.65	4.2	26 48.6	1 41.3	+11 47.2	-0.1001	0.6114	0.0623	+14	-49	
ittarii	6.5	3.64	4.2	26 38.3	1 59.7	-11 55.2	-0.2508	0.6112	0.0635	+ 7	-59	
ittarii	3.3	3.62	2.6	27 4.8	8 3.1	- 6 7.5	+0.6319	0.6069	0.0833	+58	- 7	
ittarii	2.1	+3.57	-1.8	-26 24.2	11 35.6	- 2 44.1	+0.2771	0.6040	-0.0944	+37	-25	

ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

MAY.

THE STAR'S					AT CONJUNCTION IN R. A.						Limit- ing Par- allax
Name.	Mag.	Red'ns from 1915.0.		Apparent Declina- tion.	Washington Mean Time.	Hour Angle, H	Y'	x'	y'	N. S.	
		$\Delta\alpha$	$\Delta\delta$		d h m	h m					
162 B. Sagittarii	6.4	+3.52	-1.8	-24 59.5	80 12 45.1	1 37.5	-1.0138	0.6031	+0.0980	-34 -30	
127 B. Sagittarii	6.4	3.52	1.6	25 3.7	13 31.0	0 53.6	-0.8690	0.6024	0.1003	-24 -30	
172 B. Sagittarii	5.8	3.51	1.6	24 57.9	14 17.0	0 9.5	-0.8870	0.6017	0.1026	-24 -30	
189 B. Sagittarii	6.1	3.49	1.0	24 47.5	16 26.4	+1 54.5	-0.8327	0.5998	0.1091	-20 -30	
201 B. Sagittarii	5.9	3.51	0.3	26 3.0	18 17.6	+3 41.0	+0.6280	0.5981	0.1146	+50 -8	
ψ Sagittarii	4.9	+3.49	-0.2	-25 24.3	19 10.4	+4 31.6	+0.0864	0.5973	+0.1171	+29 -38	
208 B. Sagittarii	6.1	3.46	-0.4	24 19.5	19 11.4	+4 32.7	-0.9870	0.5972	0.1172	-29 -30	
χ Sagittarii	4.9	3.43	+0.5	24 40.5	22 52.8	+8 4.9	-0.1881	0.5937	0.1276	+16 -51	
49 Sagittarii	5.5	3.42	0.4	24 7.8	22 58.5	+8 10.4	-0.7201	0.5936	0.1279	-12 -30	
51 Sagittarii	5.8	3.40	1.5	24 54.3	81 3 0.9	-11 57.0	+0.5945	0.5894	0.1388	+60 -12	
h Sagittarii	4.7	+3.41	+1.6	-25 4.3	3 16.4	-11 42.2	+0.7970	0.5892	+0.1395	+65 +2	
53 Sagittarii	6.3	3.35	1.6	23 37.3	4 30.5	-10 31.1	-0.4809	0.5879	0.1428	+2 -75	
274 B. Sagittarii	6.1	3.35	1.6	23 37.4	4 37.3	-10 24.5	-0.4620	0.5878	0.1431	+3 -75	
308 B. Sagittarii	6.3	3.31	2.8	24 9.2	10 11.9	5 3.2	+0.9066	0.5819	0.1571	+66 +9	
329 B. Sagittarii	6.1	3.25	3.3	22 58.2	13 2.8	-2 19.0	+0.1754	0.5788	0.1638	+38 -34	
336 B. Sagittarii	6.5	+3.23	+3.5	-22 50.0	13 59.6	-1 24.4	+0.1934	0.5777	+0.1660	+40 -34	
4 Capricorni	5.7	+3.15	+4.5	-22 4.3	19 49.3	+4 12.0	+0.4315	0.5713	+0.1789	+54 -30	

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81 B. Capricorni	6.4	+2.92	+5.9	-18 20.9	1 9 6.7	-7 0.0	-0.8022	0.5566	+0.2041	-8 -30	
19 Capricorni	5.7	2.88	6.3	18 14.6	11 29.5	-4 42.2	-0.4190	0.5540	0.2080	+13 -60	
20 Capricorni	6.2	2.89	7.0	19 21.8	13 35.3	-2 40.9	+1.1662	0.5517	0.2114	+71 +27	
21 Capricorni	6.5	2.85	6.6	17 51.7	14 9.9	-2 7.5	-0.2499	0.5511	0.2122	+22 -58	
θ Capricorni	4.2	2.82	6.9	17 34.2	16 25.3	+0 3.2	-0.0661	0.5487	0.2156	+32 -47	
114 B. Capricorni	6.1	+2.77	+7.6	-17 41.7	20 32.6	+4 2.0	+0.9651	0.5444	+0.2215	+72 +10	
29 Capricorni	5.5	2.72	7.0	15 31.4	20 51.2	+4 19.9	-1.1906	0.5440	0.2219	-33 -30	
URANUS	6.0	...	...	16 48.9	21 46.9	+5 13.8	+0.3355	0.5436	0.2233	+54 +25	
1 Capricorni	4.3	2.72	8.0	17 11.7	23 47.9	+7 10.6	+1.1809	0.5412	0.2257	+73 +27	
42 Capricorni	5.1	2.55	8.2	14 25.5	2 84.9	-8 5.8	-0.4069	0.5325	0.2360	+61 -22	
44 Capricorni	6.0	+2.55	+8.6	-14 47.2	9 32.3	-7 24.3	+0.9513	0.5318	+0.2367	+75 +9	
151 B. Capricorni	6.1	2.49	8.5	13 7.0	12 42.4	-4 20.3	-0.0271	0.5290	0.2398	+38 -45	
μ Capricorni	5.2	2.49	9.0	13 57.0	14 25.2	-2 40.8	+1.2526	0.5275	0.2414	+76 +34	
e Aquarii	5.4	2.35	9.4	11 58.8	22 54.9	+5 32.9	+1.2831	0.5205	0.2480	+75 +12	
150 B. Aquarii	6.0	2.28	8.9	9 27.7	3 2.7	+8 34.9	-0.5772	0.5182	0.2500	+11 -80	
186 B. Aquarii	6.1	+2.16	+8.7	-6 59.2	9 19.4	-8 21.7	-1.3494	0.5131	+0.2540	-43 -83	
167 G. Aquarii	6.3	2.13	9.7	8 20.2	12 55.7	-4 51.8	+0.9029	0.5109	0.2555	+82 +10	
67 Aquarii	6.4	2.10	9.6	7 24.3	15 26.6	-2 25.4	+0.6536	0.5093	0.2565	+81 -10	
252 B. Aquarii	5.8	2.01	9.5	5 26.3	21 39.7	+3 36.8	+0.1693	0.5060	0.2582	+57 -34	
197 G. Aquarii	6.3	2.00	9.5	5 15.7	22 46.0	+4 41.1	+0.2679	0.5054	0.2585	+57 -30	
263 B. Aquarii	6.1	+1.97	+9.6	-5 10.0	4 50.7	+6 50.9	+0.7428	0.5043	+0.2589	+82 -5	
293 B. Aquarii	5.5	1.88	9.8	3 57.4	8 26.4	-9 55.2	+1.3891	0.5012	0.2597	+78 +40	
13 Piscium	6.4	1.76	9.7	-1 33.2	17 14.0	-1 22.6	+1.1016	0.4983	0.2595	+88 +17	
λ Piscium	4.6	1.68	9.1	+1 18.9	22 41.9	+3 56.1	-0.5667	0.4970	0.2587	+14 -78	
21 Piscium	5.6	1.66	9.7	0 36.4	5 24.9	+7 50.4	+1.2348	0.4962	0.2579	+90 +27	
22 Piscium	5.8	+1.63	+9.1	+2 27.6	4 4.7	+9 10.0	-0.4158	0.4960	+0.2575	+22 -61	
25 Piscium	6.2	1.63	9.4	1 37.2	4 41.0	+9 45.2	+0.6478	0.4959	0.2574	+85 -10	
51 Piscium	5.6	1.41	9.1	6 29.3	6 2.8	+7 37.2	+0.8030	0.4953	0.2481	+90 0	
136 B. Piscium	6.5	1.35	8.5	8 53.6	6 56.8	+11 17.2	-0.6393	0.4958	0.2452	+10 -80	
75 Piscium	6.3	1.23	8.2	12 30.2	20 40.7	+0 38.1	-1.3009	0.4984	0.2348	-37 -71	
η Piscium	3.7	+1.13	+8.1	+14 54.6	7 10.0	-4 10.24	-0.9064	0.5025	+0.2222	-6 -75	
101 Piscium	6.2	1.12	8.4	14 13.8	12 17.3	-8 11.8	+0.3487	0.5033	0.2198	+63 -20	
105 Piscium	6.1	1.10	8.0	15 58.6	14 20.2	-6 12.5	-1.1329	0.5041	0.2175	-22 -74	
4 Arietis	5.8	1.07	8.0	16 32.1	18 48.3	-1 52.1	-0.7892	0.5059	0.2124	+1 -73	
1 Arietis	5.1	1.04	7.9	17 24.3	23 35.3	+2 46.6	-0.7502	0.5080	0.2066	+3 -73	
35 B. Arietis	6.4	+1.02	+7.9	+17 50.8	8 2 53.1	+5 58.5	-0.5657	0.5094	+0.2024	+13 -67	

[Eph 15]

MENTS FOR THE PREDICTION OF OCCULTATIONS.

JUNE.

THE STAR'S				AT CONJUNCTION IN R. A.							Limiting Parallels.					
Mag.	Red's from 1915.0.		Apparent Declination.	Washington Mean Time.	Hour Angle, H	Y	x'	y'	N.	S.						
	$\Delta\alpha$	$\Delta\delta$														
	s	$"$	$^{\circ}$	d	h	m	h	m	$^{\circ}$	$'$						
	6.5	+1.01	+8.1	8	4	58.9	+8	0.6	+0.0996	0.5104	+0.1996	+49	-30			
	6.4	1.01	8.2	16	49	7	5	49.1	+8	49.4	+1.1506	0.5108	0.1985	+90	+30	
	5.9	1.00	7.7	19	6	1	6	26.2	+9	25.4	-1.2453	0.5111	0.1976	-34	-71	
	5.6	0.97	7.8	19	30	6	10	16.8	-10	50.9	-0.9495	0.5129	0.1923	-10	-70	
	6.2	0.95	8.0	19	28	9	16	37.8	-4	41.4	+0.2751	0.5161	0.1830	+59	-19	
	5.4	+0.92	+7.7	+21	35	8	20	43.3	-0	43.3	-1.3376	0.5182	+0.1766	-55	-65	
	5.7	0.92	8.1	19	39	1	22	31.0	+1	1.1	+1.1359	0.5191	0.1738	+90	+32	
mean)	4.6	0.89	8.1	21	0	2	9	6	50.7	+9	5.3	+1.0260	0.5234	0.1599	+90	+25
	5.8	0.85	7.7	24	25	6	18	58.9	-3	9.4	-0.9720	0.5297	0.1376	-14	-66	
	5.9	0.84	7.8	24	10	9	23	49.8	+1	32.2	-0.0568	0.5322	+0.1281	+40	-30	
NEW MOON.																
rum	5.8	+1.09	+4.8	+24	16	4	14	2	48.5	+1	9.4	+1.2147	0.5441	-0.1045	+86	+49
rum	6.1	1.11	4.9	25	2	1	3	49.4	+2	8.2	+0.2700	0.5438	0.1067	+60	-10	
rum	5.1	1.13	4.6	25	13	0	7	51.0	+6	1.7	-0.3767	0.5424	0.1157	+22	-45	
rum	6.3	+1.18	+4.1	+24	33	2	14	40.5	-11	22.5	-0.4882	0.5399	-0.1304	+16	-53	
rum	6.0	1.18	4.0	24	25	0	15	7.4	-10	56.5	-0.3983	0.5397	0.1313	+21	-48	
rum	6.3	1.17	3.8	23	13	0	15	58.1	-10	7.5	-0.8038	0.5394	0.1331	+90	+15	
rum	3.7	1.20	3.9	24	36	2	17	33.7	-8	35.0	-0.9288	0.5387	0.1364	-11	-65	
rum	6.3	1.20	3.5	23	21	2	19	29.9	-6	42.7	+0.1718	0.5380	-0.1404	+53	-19	
	6.4	+1.25	+3.2	+23	49	1	15	1	20.0	-1	4.2	-1.1894	0.5356	-0.1521	-32	-66
	6.2	1.26	2.9	22	52	8	3	50.6	+1	21.5	-0.5522	0.5345	0.1570	+13	-60	
	5.5	1.25	2.5	21	49	8	4	32.9	+2	2.4	-0.4821	0.5342	0.1584	+74	-5	
	6.0	1.29	1.8	21	1	0	10	32.6	+7	50.5	+0.3840	0.5317	-0.1696	+67	-12	
	5.5	1.33	1.3	20	43	9	16	29.1	-10	24.4	-0.3437	0.5291	0.1801	+25	-51	
	6.5	+1.36	+0.9	+20	18	5	20	4.0	-6	56.3	-0.5408	0.5276	-0.1862	+14	-62	
	6.5	1.36	0.9	20	16	4	20	6.5	-6	53.9	-0.5091	0.5275	0.1863	+16	-61	
	6.5	1.35	0.8	19	58	3	20	11.8	-6	48.8	-0.1990	0.5275	0.1864	+32	-43	
	6.3	1.35	0.8	19	50	8	20	14.4	-6	46.3	-0.0713	0.5275	0.1865	+39	-37	
	4.2	1.35	0.2	18	28	0	22	18.8	-4	45.8	+1.0339	0.5267	0.1899	+90	+23	
(var.)	6.1	+1.39	+0.2	+19	9	0	16	1	15.7	-1	54.5	-0.2734	0.5254	-0.1946	+28	-49
	6.2	1.39	0.4	17	33	3	3	32.9	+0	18.4	+1.0040	0.5245	0.1982	+90	+20	
	6.4	1.47	2.1	15	43	9	16	22.1	-11	16.3	+0.3063	0.5197	0.2167	+61	-21	
	6.2	1.52	3.0	14	45	5	23	42.3	-4	9.6	-0.2723	0.5173	0.2260	+20	-53	
	6.5	1.53	3.1	14	43	9	17	0	47.0	-3	6.8	-0.4871	0.5169	0.2273	+18	-65
	5.6	+1.56	+3.5	+14	24	6	3	39.8	-0	19.2	-0.8017	0.5161	-0.2307	+1	-76	
	5.8	1.54	4.2	12	12	1	5	1.8	+1	0.3	+1.2480	0.5157	0.2322	+90	+34	
	6.4	1.54	4.4	11	57	6	5	33.7	+1	31.2	+1.3814	0.5156	0.2328	+73	+54	
	5.0	1.60	4.6	12	51	0	11	1.5	+6	49.1	-0.8579	0.5143	0.2387	+3	-77	
	4.6	1.62	5.8	10	24	8	15	58.9	+11	37.6	+0.5458	0.5132	0.2435	+76	-13	
	5.9	+1.69	+7.0	+9	12	9	18	0	51.6	-3	45.7	-0.3784	0.5120	-0.2512	+24	-62
	5.2	1.71	8.0	7	23	4	5	46.3	+1	0.2	+0.3131	0.5116	0.2548	+61	-26	
	6.3	1.77	8.7	6	49	1	11	33.9	+6	37.5	-0.5714	0.5114	0.2586	+14	-77	
	5.0	1.82	10.2	4	4	3	18	59.6	-10	10.1	+0.3851	0.5117	0.2626	+65	-23	
	5.7	1.82	11.1	2	24	9	22	15.9	-6	59.6	+1.2616	0.5121	0.2640	+90	+30	
	5.4	+1.89	+11.5	+2	28	5	19	3	32.7	-1	52.2	-0.2030	0.5129	-0.2660	+33	-54
	6.0	1.89	11.6	2	6	8	4	22.8	-1	3.7	-0.0469	0.5130	0.2662	+41	-46	
	6.3	1.90	12.4	0	35	7	6	36.9	+1	6.4	+0.9428	0.5135	0.2668	+90	+6	
	5.5	1.92	11.9	+1	52	3	6	59.1	+1	27.9	-0.4881	0.5135	0.2670	+18	-72	
	4.5	1.97	13.1	0	21	5	13	31.7	+7	48.7	+0.0842	0.5152	0.2682	+48	-39	
	6.5	+2.15	+16.0	+5	15	1	20	8	6.2	+1	48.9	+0.1622	0.5228	-0.2671	+51	-34
	4.8	2.29	17.3	7	32	0	20	10.6	-10	29.7	-0.6954	0.5300	0.2623	+6	-90	
	6.0	2.37	18.8	11	11	6	21	3	17.0	-3	37.2	+1.1873	0.5350	0.2579	+79	+25
	5.0	2.38	18.0	9	5	0	3	18.2	-3	36.1	-0.9659	0.5350	0.2579	+10	-90	
	5.2	2.46	18.6	10	17	5	9	34.6	+2	27.9	-1.3361	0.5398	0.2529	+43	-83	
	5.6	+2.63	+20.1	+14	55	9	20	49.6	-10	40.2	+0.5753	0.5495	-0.2412	+70	-83	

ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

JUNE.

THE STAR'S				AT CONJUNCTION IN R. A.							Limit- ing Par- allels.	
Name.	Mag.	Red'ns from 1915.0.		Apparent Declina- tion.	Washington Mean Time.			Hour Angle, H	Y	x'	y'	N. S.
		$\Delta\alpha$	$\Delta\delta$		d	h	m					
83 Virginis	5.6	+2.71	-20.2	-15 45.5	22	1	56.0	-5 44.5	+0.1903	0.5542	-0.2346	+47-33
85 Virginis	6.1	2.71	20.1	15 20.8	2	24.7	-5 16.8	-0.3352	0.5547	0.2340	+20-03	
43 H. Virginis	5.5	2.92	20.4	17 48.6	15	5.5	+6 56.4	-0.7098	0.5672	0.2141	-2-30	
231 G. Virginis	6.4	2.94	20.4	18 11.8	15	46.7	+7 36.1	-0.4706	0.5679	0.2129	+11-73	
236 G. Virginis	5.7	2.95	20.4	18 19.7	16	26.0	+8 13.9	-0.4779	0.5685	0.2117	+10-73	
9 G. Libræ	6.5	+3.07	-20.4	-20 4.3	23	3.5	-9 23.6	-0.0993	0.5753	-0.1989	+28-49	
17 G. Libræ	6.4	3.15	20.3	20 49.3	23	3 36.6	-5 1.1	-0.2378	0.5799	0.1893	+19-57	
18 G. Libræ	6.1	3.16	20.2	20 58.5	4	1.4	-4 37.2	-0.1641	0.5803	0.1884	+23-53	
43 B. Libræ	5.7	3.26	20.7	21 2.3	8	1.8	-0 46.4	-0.8363	0.5843	0.1793	-13-30	
47 G. Libræ	6.1	3.30	19.6	21 42.4	11	34.3	+2 37.7	-0.7931	0.5879	0.1708	-12-30	
64 G. Libræ	5.8	+3.36	-19.2	-22 5.4	15	24.3	+6 18.4	-1.0485	0.5916	-0.1612	-30-30	
153 B. Libræ	6.3	3.50	18.8	24 12.4	21	45.0	-11 36.5	+0.0744	0.5974	0.1442	+31-39	
42 Libræ	5.0	3.52	18.3	23 32.9	0	25.8	-9 2.3	-0.9522	0.5998	0.1366	-20-30	
b Scorpil	4.7	3.62	18.0	25 29.9	4	22.8	-5 15.3	+0.4554	0.6030	0.1251	+50-18	
A Scorpil	4.6	3.63	17.7	25 4.7	5	21.4	-4 19.2	-0.0793	0.6038	0.1221	-20-48	
31 B. Scorpil	5.4	+3.62	-17.6	-24 17.1	5	28.3	-4 12.6	-0.8751	0.6039	-0.1218	-22-30	
3 Scorpil	5.9	3.63	17.6	24 59.8	5	44.6	-3 57.0	-0.2065	0.6041	0.1210	+14-30	
4 Scorpil	5.7	3.66	17.8	26 1.3	6	2.5	-3 39.8	+0.7661	0.6043	0.1201	+64-0	
40 B. Scorpil	5.4	3.64	17.3	24 35.5	7	11.4	-2 33.8	-0.7781	0.6052	0.1166	-17-30	
π Scorpil	3.0	3.68	17.5	25 52.5	7	16.4	-2 29.1	+0.4766	0.6053	0.1164	+50-17	
48 B. Scorpil	4.9	+3.68	-17.2	-25 38.0	8	55.4	-0 54.3	+0.0511	0.6065	-0.1113	+26-40	
50 B. Scorpil	6.4	3.67	16.9	24 29.8	9	8.6	-0 41.7	-1.0925	0.6066	0.1106	-38-30	
65 B. Scorpil	5.5	3.73	16.9	26 6.2	10	39.3	+0 45.1	+0.3259	0.6078	0.1059	+41-35	
85 B. Scorpil	6.0	3.74	16.2	25 16.0	13	7.5	+3 7.0	-0.7504	0.6094	0.0980	-17-30	
σ Scorpil	3.1	3.78	15.8	25 23.6	15	24.0	+5 17.5	-0.8390	0.6109	0.0907	-23-30	
α Scorpil	1.2	+3.84	-15.3	-26 14.9	18	20.6	-8 6.4	-0.2514	0.6126	-0.0810	+8-39	
116 B. Scorpil	6.2	3.85	15.2	26 21.5	19	3.0	+8 47.0	-0.2005	0.6130	0.0787	-10-35	
134 B. Scorpil	6.4	3.94	14.2	27 18.1	23	38.6	-10 49.5	+0.4009	0.6151	0.0632	+41-21	
118 B. Ophiuchi	6.2	4.00	12.2	26 24.1	7	39.5	-3 9.9	-0.8785	0.6178	0.0355	-30-30	
95 G. Ophiuchi	6.1	4.06	11.8	27 39.7	9	35.5	-1 19.1	+0.2958	0.6182	0.0287	+33-26	
36 Ophi. (1st star)	5.4	+4.01	-12.0	-26 28.9	10	39.5	-0 17.9	-0.8907	0.6183	-0.0250	-31-30	
43 Ophiuchi	5.4	4.11	10.8	28 3.9	13	26.4	+2 21.5	+0.6077	0.6187	0.0151	+52-0	
151 G. Ophiuchi	6.0	4.07	9.9	26 12.5	16	25.0	+5 12.2	-1.2456	0.6188	-0.0046	-60-77	
163 G. Ophiuchi	6.3	4.15	8.8	27 50.8	20	27.7	-9 4.1	-0.3746	0.6186	+0.0097	+36-22	
λ Sagittarii (var.)	4.4	4.16	8.4	27 48.1	21	58.0	+10 30.3	+0.3493	0.6184	0.0150	+35-43	
4 G. Sagittarii	6.2	+4.14	-8.3	-26 56.9	22	17.8	+10 49.3	-0.4848	0.6183	+0.0162	-9-70	
10 G. Sagittarii	5.7	4.19	7.5	28 3.3	1	11.2	-10 25.0	+0.6645	0.6178	0.0263	+57-5	
38 B. Sagittarii	4.7	4.23	6.3	28 28.1	5	12.7	-6 34.2	+1.2077	0.6167	0.0404	+62-40	
48 G. Sagittarii	6.3	4.24	5.5	28 19.1	8	31.2	-3 24.5	+1.2125	0.6154	0.0518	+62-44	
66 B. Sagittarii	4.7	4.19	5.3	27 4.5	8	46.6	-3 9.8	+0.0022	0.6153	0.0527	+19-43	
68 G. Sagittarii	6.2	+4.19	-4.3	-26 41.2	12	14.4	-0 8.9	-0.1773	0.6137	+0.0645	+10-54	
69 G. Sagittarii	6.3	4.19	4.2	26 48.6	12	22.4	+0 16.5	-0.0477	0.6137	0.0649	+17-40	
86 B. Sagittarii	6.5	4.18	4.2	26 38.3	12	40.8	+0 34.2	-0.1973	0.6135	0.0660	+9-35	
126 B. Sagittarii	5.7	4.14	2.5	25 5.9	18	25.4	+6 3.7	-1 2837	0.6102	0.0850	-63-07	
φ Sagittarii	3.3	4.21	2.4	27 4.8	18	41.6	+6 19.3	+0.6957	0.6100	0.0858	+62-4	
σ Sagittarii	2.1	+4.18	-1.4	-26 24.2	22	12.3	+9 40.8	+0.3497	0.6076	+0.0971	+41-24	
162 B. Sagittarii	6.4	4.13	1.1	24 59.5	23	21.1	+10 46.7	-0.9331	0.6068	0.1007	-27-30	
127 G. Sagittarii	6.4	4.14	0.8	25 3.7	0	6.5	+11 30.1	-0.7869	0.6063	0.1030	-18-30	
172 B. Sagittarii	5.8	4.13	0.8	24 57.9	0	52.0	-11 46.3	-0.8034	0.6057	0.1054	-19-30	
189 B. Sagittarii	6.1	4.12	-0.1	24 47.5	3	0.1	-9 43.6	-0.7444	0.6040	0.1119	-15-30	
201 B. Sagittarii	5.9	+4.16	-0.5	-26 3.0	4	50.0	-7 58.4	+0.7126	0.6025	+0.1175	+64-3	
ψ Sagittarii	4.9	4.14	0.7	25 24.2	5	42.1	-7 8.5	+0.1758	0.6018	0.1201	+34-33	
208 B. Sagittarii	6.1	4.10	0.6	24 19.5	5	43.1	-7 7.5	-0.8915	0.6018	0.1201	-23-30	
χ Sagittarii	4.9	4.10	1.7	24 40.4	9	21.6	-3 38.2	-0.0892	0.5986	0.1307	+21-48	
49 Sagittarii	5.5	4.08	1.7	24 7.8	9	27.1	-3 32.8	-0.6177	0.5985	0.1309	-6-88	
51 Sagittarii	5.8	+4.10	-2.8	-24 54.3	13	26.1	+0 16.3	+0.6967	0.5949	+0.1421	+66-4	

ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

JUNE.

THE STAR'S					AT CONJUNCTION IN R. A.						Limiting Par- allels.	
Name.	Mag.	Red'ns from 1915.0.		Apparent Declina- tion.	Washington Mean Time.	Hour Angle, H	Y	x'	y'	N.	S.	
		$\Delta\alpha$	$\Delta\delta$									
		s	"	' "	d h m	h m				' "	' "	
Sagittarii	4.7	+4.10	+2.9	25 4.3	27 13 41.4	+0 30.9	+0.8083	0.5947	+0.1428	+65	+9	
Sagittarii	6.3	4.04	3.1	23 37.3	14 54.3	+1 40.8	-0.3681	0.5935	0.1461	+8	-66	
B. Sagittarii	6.1	4.04	3.1	23 37.4	15 1.0	+1 47.3	-0.3491	0.5934	0.1463	+10	-66	
B. Sagittarii	6.3	4.03	4.4	24 9.1	20 30.1	+7 3.1	+1.0203	0.5880	0.1606	+66	+17	
B. Sagittarii	6.1	3.98	5.2	22 58.2	23 17.9	+9 44.2	+0.3007	0.5851	0.1674	+46	-27	
B. Sagittarii	6.5	+3.97	+5.5	-22 50.0	28 0 13.7	+10 37.7	+0.3203	0.5841	+0.1697	+46	-26	
Capricorni	5.7	3.91	6.8	22 4.3	5 56.6	-7 52.7	+0.5675	0.5781	0.1824	+62	-12	
Capricorni	5.3	3.73	8.3	18 26.2	15 2.1	+0 52.1	-1.3381	0.5684	0.2013	-57	-72	
B. Capricorni	6.4	3.70	9.1	18 20.8	18 56.6	+4 37.9	-0.6289	0.5642	0.2084	+2	-87	
Capricorni	5.7	3.67	9.6	18 14.6	21 16.1	+6 52.4	-0.2455	0.5617	0.2124	+22	-57	
Capricorni	6.2	+3.69	+10.2	-19 21.8	23 18.9	+8 50.7	+1.3256	0.5595	+0.2158	+71	+46	
Capricorni	6.5	3.64	10.1	17 51.6	23 52.6	+9 23.2	-0.0735	0.5589	0.2167	+31	-47	
Capricorni	4.2	3.62	10.4	17 34.1	29 2 4.7	+11 30.6	+0.1120	0.5566	0.2202	+41	-37	
B. Capricorni	6.1	3.58	11.3	17 41.6	6 5.9	-8 36.7	+1.1379	0.5524	0.2260	+72	+23	
URANUS	6.0	...	...	16 59.3	6 21.6	-8 21.6	+0.4796	0.5533	0.2268	+63	-18
Capricorni	5.5	+3.53	+10.8	-15 31.3	6 24.1	-8 19.1	-1.0008	0.5521	+0.2264	-18	-90	
Capricorni	4.3	3.54	11.8	17 11.6	9 16.4	+5 32.9	+1.3561	0.5492	0.2303	+70	+50	
Capricorni	5.1	3.39	12.5	14 25.4	18 3.9	+2 56.7	+0.6047	0.5405	0.2407	+72	-11	
Capricorni	6.0	3.39	12.8	14 47.1	18 45.6	+3 37.0	+1.1432	0.5399	0.2414	+75	-22	
B. Capricorni	6.1	3.32	13.0	13 7.0	21 50.6	+6 35.9	+0.1813	0.5370	0.2445	+49	-34	
B. Aquarii	6.0	+3.12	+13.9	-9 27.6	30 10 49.5	-4 50.4	-0.3458	0.5260	+0.2546	+23	-63	
Aquarii	5.3	3.09	13.8	8 14.7	12 26.9	+3 16.2	-1.1926	0.5247	0.2555	-26	-90	
B. Aquarii	6.1	3.03	14.0	6 59.1	17 54.6	+2 1.3	-1.1011	0.5207	0.2584	-19	-90	
G. Aquarii	6.3	3.01	14.9	8 20.1	21 25.1	+5 25.3	+1.2148	0.5183	0.2598	+82	+27	
Aquarii	6.4	+2.97	+14.9	-7 24.2	23 52.1	+7 47.9	+0.8817	0.5167	+0.2607	+83	+3	

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B. Aquarii	5.8	+2.88	+15.0	-5 26.2	1 5 55.5	-10 19.6	+0.4081	0.5130	+0.2622	+66	-22
G. Aquarii	6.3	2.87	15.0	5 15.6	7 0.2	-9 16.9	+0.5061	0.5124	0.2624	+73	-17
B. Aquarii	6.1	+2.85	+15.2	-5 9.9	9 10.5	-7 10.5	+0.9764	0.5112	+0.2628	+85	+9
B. Piscium	6.4	2.68	14.6	0 10.3	20 35.9	+3 54.8	-1.2880	0.5059	0.2631	-32	-90
Piscium	6.4	2.65	15.4	-1 33.1	2 1.3	+8 12.5	+1.3380	0.5042	0.2626	+86	+39
Piscium	5.7	2.59	14.6	+1 38.1	3 22.2	+10 29.3	-1.4326	0.5034	0.2622	-59	-66
Piscium	4.6	2.56	14.8	1 19.0	6 21.9	-10 36.3	-0.3110	0.5025	0.2615	+27	-61
Piscium	5.8	+2.50	+14.8	+2 27.7	11 37.7	-5 29.5	-0.1620	0.5012	+0.2601	+35	-52
Piscium	6.2	2.51	15.1	1 37.3	12 13.4	-4 54.8	+0.8905	0.5010	0.2599	+90	+3
Piscium	5.6	2.28	14.6	6 29.4	3 9 17.1	-8 26.8	+1.0390	0.4989	0.2494	+90	+14
B. Piscium	6.5	2.24	13.9	8 53.7	14 4.7	-3 51.2	-0.3940	0.4991	0.2462	+23	-63
Piscium	6.3	2.11	13.1	12 30.3	4 33.4	+9 18.4	-1.0621	0.5007	0.2351	-16	-77
Piscium	3.7	+2.00	+12.6	+14 54.7	16 44.5	-1 53.3	-0.6842	0.5039	+0.2219	+7	-75
Piscium	6.2	1.08	12.8	14 13.9	19 0.2	+0 18.5	+0.5613	0.5046	0.2193	+79	-9
Piscium	6.1	1.97	12.4	15 58.7	21 1.9	+2 16.7	-0.9146	0.5052	0.2170	+7	-74
Arietis	6.4	1.94	12.1	16 59.5	0 37.9	+5 46.4	-1.2549	0.5065	0.2127	-34	-73
Arietis	5.8	1.93	12.2	16 32.2	1 28.0	+6 35.0	-0.5782	0.5068	0.2117	+13	-69
Arietis	5.1	+1.90	+12.0	+17 24.4	6 12.8	+11 11.5	-0.5453	0.5085	+0.2057	+14	-66
B. Arietis	6.4	1.87	11.8	17 50.9	9 29.4	-9 37.7	-0.3660	0.5098	0.2014	+24	-55
B. Arietis	6.5	1.85	12.0	17 37.7	11 34.5	-7 36.3	+0.2937	0.5107	0.1986	+61	-20
H ¹ . Arietis	6.4	1.85	12.1	16 49.8	12 24.3	-6 48.0	+1.3394	0.5110	0.1974	+75	+53
Arietis	5.9	1.84	11.4	19 6.2	13 1.2	-6 12.2	-1.0475	0.5113	0.1966	-17	-71
Arietis	5.6	+1.82	+11.4	+19 30.7	16 50.6	-2 29.6	-0.7582	0.5130	+0.1911	+2	-70
Arietis	6.2	1.78	11.4	19 28.9	23 9.9	+3 38.2	+0.4530	0.5158	0.1817	+72	-10
Arietis	5.4	1.75	10.7	21 35.8	3 14.4	+7 35.3	-1.1602	0.5178	0.1752	-28	-68
Arietis	5.7	1.74	11.3	19 39.2	5 1.8	+9 19.4	+1.3029	0.5186	0.1724	+79	+52
Arietis (mean)	4.6	1.68	10.8	21 0.2	13 20.0	-6 37.8	+1.1814	0.5228	0.1583	+90	+39
Arietis	5.8	+1.62	+9.6	+24 25.6	7 1 26.8	+5 6.0	-0.8300	0.5289	+0.1350	+83	+43

[Eph 13]

ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

JULY.

THE STAR'S					AT CONJUNCTION IN R. A.						Limiting Par- allels
Name.	Mag.	Red'ns from 1915.0.		Apparent Declina- tion.	Washington Mean Time.	Hour Angle, H	Y	x'	y'	N. S.	
		$\Delta\alpha$	$\Delta\delta$								
7 Tauri	5.9	+1.59	+9.6	+24 11.0	7 6 17.2	+9 47.1	+0.0756	0.5313	+0.1264	+48-23	
11 Tauri	6.1	1.58	9.4	25 3.5	9 16.3	-11 19.6	-0.5276	0.5328	0.1204	+14-55	
16 Tauri	5.4	1.56	9.6	24 1.5	11 11.4	-9 28.3	+0.8459	0.5337	0.1165	+00+19	
17 Tauri	3.8	1.56	9.6	23 51.0	11 13.6	-9 26.2	+1.0454	0.5337	0.1164	+00+31	
18 Tauri	5.6	1.56	9.4	24 34.6	11 21.0	-9 18.9	+0.2533	0.5338	0.1161	+59-13	
9 Tauri	4.3	+1.56	+9.5	+24 12.3	11 22.6	-9 17.4	+0.6693	0.5338	+0.1161	+00+0	
20 Tauri	4.1	1.56	9.5	24 6.3	11 40.2	-9 0.4	+0.8127	0.5339	0.1155	+00+18	
21 Tauri	5.8	1.56	9.5	24 17.6	11 42.3	-8 58.4	+0.6092	0.5339	0.1154	+87+6	
22 Tauri	6.5	1.56	9.5	24 16.0	11 46.3	-8 54.5	+0.6462	0.5340	0.1153	+00+8	
7 Tauri	3.0	1.56	9.6	23 50.7	12 27.3	-8 14.9	+1.1911	0.5343	0.1139	+00+45	
28 Tauri	5.2	+1.55	+9.5	+23 52.8	13 15.2	-7 28.5	+1.2429	0.5347	+0.1122	+83+51	
14 H. Tauri	5.3	1.56	9.1	25 19.6	13 45.6	-6 59.0	-0.3058	0.5349	0.1111	+26+41	
p Tauri	5.6	1.52	8.7	26 15.7	23 17.8	+2 14.2	-0.3825	0.5393	0.0905	+22-44	
q Tauri	5.0	1.50	8.3	27 9.0	8 34.0	+6 27.9	-0.9939	0.5411	0.0808	-17-05	
x Tauri	5.3	1.49	8.7	25 25.9	4 43.1	+7 28.8	+0.9974	0.5415	0.0784	+00+33	
17 B. Aurigæ	6.0	+1.46	+7.7	+27 45.5	18 24.4	-3 17.8	-0.7284	0.5463	+0.0463	+1-62	
38 B. Aurigæ	6.5	1.44	7.5	27 34.8	23 44.5	+1 51.4	-0.3178	0.5478	0.0334	+25-34	
47 B. Aurigæ	6.0	1.43	7.3	27 55.6	9 2 1.8	+4 3.9	-0.6311	0.5484	0.0278	+7-55	
354 B. Tauri	6.4	1.42	7.1	27 52.4	7 3.8	+8 55.5	-0.4039	0.5494	0.0154	+17-43	
β Tauri	1.8	1.42	6.8	28 32.3	9 25.0	+11 11.8	-1.1698	0.5498	+0.0096	-35-01	
107 B. Aurigæ	6.5	+1.40	+6.8	+27 36.6	13 43.9	-8 38.2	-0.1229	0.5504	-0.0011	+36-21	
112 B. Aurigæ	5.7	1.39	+6.9	26 52.4	14 17.2	-8 6.2	+0.6898	0.5505	0.0025	+90+21	
NEW MOON.											
π Cancri	5.6	+1.41	-1.7	+15 17.7	13 19 4.7	-6 40.8	+1.3093	0.5235	-0.2150	+83+45	
227 B. Cancri	6.4	+1.43	-1.8	+15 43.9	22 3.2	-3 47.8	+0.1922	0.5224	-0.2190	+54-17	
7 Leonis	6.2	1.45	2.7	14 45.5	14 5 20.8	+3 16.3	-0.3946	0.5197	0.2283	+23-60	
11 Leonis	6.5	1.40	2.8	14 43.9	6 25.1	+4 18.7	-0.6105	0.5194	0.2295	+11-13	
ψ Leonis	5.6	1.47	3.1	14 24.6	9 17.1	+7 5.4	-0.9283	0.5184	0.2328	-7-76	
18 Leonis	5.8	1.45	3.7	12 12.1	10 38.6	+8 24.4	+1.1182	0.5180	0.2344	+90+23	
19 Leonis	6.4	+1.45	-3.7	+11 57.6	11 10.3	+8 55.1	+1.2508	0.5179	-0.2349	+00+35	
R Leonis (var.)	5-10	1.45	3.8	11 49.4	11 14.1	+8 58.8	+1.3838	0.5178	0.2350	+72+55	
v Leonis	5.0	1.40	4.0	12 51.0	16 36.8	-9 48.3	-0.9931	0.5163	0.2406	-10-77	
A Leonis	4.6	1.49	5.0	10 24.8	21 33.2	-5 0.8	+0.4052	0.5150	0.2453	-67-09	
44 Leonis	5.9	1.54	6.0	9 12.9	15 6 24.8	+3 35.0	-0.5280	0.5132	0.2526	+16-71	
48 Leonis	5.2	+1.55	-6.8	+7 23.4	11 19.4	+8 20.8	+0.1602	0.5125	-0.2561	+52-14	
35 Sextantis	6.1	1.56	7.8	5 11.5	15 43.2	-11 23.3	+1.3541	0.5120	0.2588	+83+44	
37 Sextantis	6.3	1.59	7.5	6 49.2	17 7.3	-10 1.7	-0.7308	0.5119	0.2566	+5-83	
d Leonis	5.0	1.62	8.8	4 4.3	16 0 34.2	-2 48.1	+0.2235	0.5117	0.2632	+56-31	
p ⁴ Leonis	5.7	1.62	9.6	2 24.9	3 51.3	+0 23.1	+1.1014	0.5117	0.2644	+90+17	
75 Leonis	5.4	+1.68	-10.0	+2 28.5	9 9.8	+5 32.2	-0.3715	0.5121	-0.2660	+24-04	
76 Leonis	6.0	1.68	10.1	2 6.8	10 0.2	+6 21.0	-0.2151	0.5121	0.2663	+32-55	
359 B. Leonis	6.3	1.69	10.7	0 35.8	12 15.1	+8 31.9	+0.7784	0.5124	0.2667	+90-7	
79 Leonis	5.5	1.70	10.4	+1 52.3	12 37.6	+8 53.7	-0.6597	0.5124	0.2668	+0-46	
v Leonis	4.5	1.74	11.5	-0 21.5	19 13.3	-8 42.3	-0.0867	0.5136	0.2675	+39-46	
431 B. Leonis	6.2	+1.73	-12.1	-1 58.2	19 57.9	-7 59.1	+1.3998	0.5137	-0.2677	+77+46	
78 B. Virginis	6.5	1.90	14.3	5 15.0	17 14 1.5	+9 31.7	-0.0100	0.5102	0.2653	+27+44	
9 Virginis	5.3	1.99	16.1	8 59.3	23 38.4	-5 9.3	+1.3241	0.5237	0.2613	+81+36	
x Virginis	4.8	2.03	15.7	7 31.9	2 18.2	+2 34.5	-0.8739	0.5251	0.2598	-4-00	
370 B. Virginis	6.0	2.11	17.2	11 11.6	9 33.3	+4 26.7	+1.0317	0.5204	0.2550	+79+13	
ψ Virginis	5.0	+2.12	-16.5	-9 4.9	9 34.5	+4 27.8	-1.1456	0.5204	-0.2550	-25-00	
75 Virginis	5.6	2.37	18.8	14 55.9	3 31.0	+2 11.2	+0.4237	0.5422	0.2375	+61-21	
83 Virginis	5.6	2.45	19.1	15 45.4	8 45.6	+2 52.7	+0.0375	0.5465	0.2308	+39-42	
85 Virginis	6.1	2.46	19.0	15 20.8	9 15.1	+3 21.2	-0.4949	0.5469	0.2302	+12-74	
43 H. Virginis	5.5	2.68	19.5	17 48.6	22 17.8	-8 3.7	-0.8643	0.5583	0.2161	+11-00	
31 G. Virginis	6.4	+2.70	-19.5	-18 11.8	23 0.2	-7 22.8	-0.6207	0.5590	-0.2689	-2-46	

ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

JULY.

THE STAR'S				AT CONJUNCTION IN R. A.					Limiting Parallels.	
Name.	Mag.	Red'n's from 1915.0.		Apparent Declination.	Washington Mean Time.	Hour Angle, H	Y	z'	y'	N. S.
		$\Delta\alpha$	$\Delta\delta$		d h m	h m				' "
G. Virginis	5.7	+2.71	-19.6	-18 19.7	19 23 40.7	6 43.8	-0.6276	0.5596	-0.2077	+ 2 -57
G. Libræ	6.5	2.85	19.8	20 4.3	20 6 30.4	0 9.0	-0.2368	0.5659	0.1949	+20 -87
G. Libræ	6.4	2.94	19.8	20 49.3	11 12.0	+ 4 22.0	-0.3725	0.5703	0.1854	+13 -66
G. Libræ	6.1	2.95	19.8	20 58.5	11 37.6	+ 4 46.7	-0.2973	0.5707	0.1845	+16 -61
B. Libræ	5.7	3.07	20.4	21 2.3	15 45.7	+ 8 45.3	-0.9755	0.5745	0.1754	-22 90
G. Libræ	6.1	+3.10	-19.4	-21 42.4	19 24.9	-11 43.9	-0.9277	0.5779	-0.1670	-20 90
G. Libræ	5.8	3.18	19.0	22 5.4	23 22.2	7 55.9	-1.1826	0.5815	0.1575	-41 90
B. Libræ	6.3	3.34	18.9	24 12.4	5 55.1	+ 1 38.6	-0.0348	0.5873	0.1407	+25 45
Libræ	5.0	3.38	18.3	23 32.9	8 41.1	+ 1 0.7	-1.0738	0.5896	0.1333	-34 90
Scorpii	4.7	3.49	18.3	25 29.9	12 45.7	+ 4 55.4	+0.3601	0.5929	0.1219	+44 -23
Scorpii	4.6	+3.50	-18.0	-25 4.7	13 46.1	+ 5 53.3	-0.1814	0.5937	-0.1190	+15 -54
B. Scorpii	5.4	3.49	17.7	24 17.1	13 53.2	+ 6 0.1	-0.0892	0.5938	0.1187	-29 90
Scorpii	5.9	3.51	17.9	24 59.8	14 10.0	+ 6 16.2	-0.3102	0.5940	0.1179	+ 9 -63
Scorpii	5.7	3.53	18.2	26 1.3	14 28.5	+ 6 34.0	+0.6776	0.5942	0.1170	+63 -5
B. Scorpii	5.4	3.53	17.5	24 35.5	15 39.6	+ 7 42.2	-0.8885	0.5951	0.1136	-23 90
Scorpii	3.0	+3.56	-17.9	-25 52.0	15 44.8	+ 7 47.1	+0.3852	0.5952	-0.1133	+45 -22
B. Scorpii	4.9	3.58	17.5	25 38.5	17 26.9	+ 9 25.0	-0.0447	0.5964	0.1083	-22 -46
B. Scorpii	6.4	3.57	17.2	24 29.8	17 40.5	+ 9 38.0	-1.2051	0.5966	0.1077	-48 -88
B. Scorpii	5.5	3.64	17.3	26 6.3	19 14.0	+11 7.8	+0.2364	0.5977	0.1030	+36 -30
B. Scorpii	6.0	3.66	16.6	25 16.0	21 46.8	-10 25.9	-0.8527	0.5995	0.0953	-23 90
Scorpii	3.1	+3.71	-16.2	-25 23.7	22 0 7.4	-8 11.2	-0.9396	0.6010	-0.0881	-29 90
Scorpii	1.2	3.78	15.9	26 14.9	3 9.4	+ 5 16.9	-0.3395	0.6028	0.0786	+ 3 -65
B. Scorpii	6.2	3.80	15.7	26 21.5	3 53.1	+ 4 35.0	-0.2871	0.6032	0.0763	+ 6 -61
Scorpii	2.9	3.87	15.9	28 2.7	5 31.0	+ 3 1.3	+1.2744	0.6041	0.0711	+62 +55
B. Scorpii	6.4	3.91	15.0	27 18.1	8 36.8	+ 0 3.4	+0.3287	0.6056	0.0611	+37 -25
B. Ophiuchi	6.2	+4.02	-12.8	-26 24.2	16 51.3	+ 7 49.9	-0.9573	0.6089	-0.0338	-35 90
G. Ophiuchi	6.1	4.09	12.6	27 39.7	18 50.4	+ 9 43.8	+0.2349	0.6094	0.0271	-29 90
Ophi. (1st star)	5.4	4.05	12.7	26 29.0	19 56.1	+10 46.7	-0.9653	0.6097	0.0234	-36 90
Ophiuchi	5.4	4.17	11.7	28 3.9	22 47.4	-10 29.5	+0.5555	0.6102	-0.0137	+48 -12
G. Ophiuchi	6.3	4.26	9.7	27 50.8	23 59.1	+ 3 36.5	+0.3284	0.6109	+0.0109	+33 -25
Sagittarii (var.)	4.4	+4.28	9.2	-27 48.1	7 31.5	+ 2 8.2	+0.3047	0.6108	+0.0161	+32 -26
G. Sagittarii	6.2	4.26	9.0	26 56.9	7 51.8	+ 1 48.7	-0.5383	0.6108	0.0173	-12 -81
G. Sagittarii	5.7	4.34	8.3	28 3.3	10 49.1	+ 1 0.9	+0.6274	0.6106	0.0274	+54 -7
B. Sagittarii	4.7	4.40	7.2	28 28.2	14 55.8	+ 4 56.9	+1.1810	0.6100	0.0413	+62 +36
G. Sagittarii	6.3	4.43	6.3	28 19.1	18 18.3	+ 8 10.6	+1.1896	0.6091	0.0526	+62 +37
B. Sagittarii	4.7	+4.38	-5.9	-27 4.5	18 34.1	+ 8 25.8	-0.0319	0.6091	+0.0535	+17 -45
G. Sagittarii	6.2	4.41	4.8	26 41.2	22 5.8	+11 48.3	-0.2085	0.6080	0.0652	+ 9 -56
G. Sagittarii	6.3	4.41	4.8	26 48.6	22 13.9	+11 56.1	-0.0774	0.6079	0.0656	+16 -48
B. Sagittarii	6.5	4.40	4.7	26 38.3	22 32.6	-11 46.0	-0.2280	0.6078	0.0667	+ 8 -57
Sagittarii	3.3	4.48	2.9	27 4.8	24 39.6	+ 5 54.6	+0.6803	0.6051	0.0865	+61 -5
Sagittarii	2.1	+4.47	-1.7	-26 24.2	8 13.4	+ 2 29.9	+0.3360	0.6032	+0.0977	+41 -24
B. Sagittarii	6.4	4.42	1.2	24 59.5	9 23.2	+ 1 23.1	-0.9543	0.6026	0.1013	-29 90
G. Sagittarii	6.4	4.43	0.9	25 3.7	10 9.3	+ 0 38.9	-0.8060	0.6021	0.1037	-19 90
B. Sagittarii	5.8	4.43	0.8	24 57.9	10 55.4	+ 0 5.3	-0.8214	0.6016	0.1060	-20 90
B. Sagittarii	6.1	4.44	-0.1	24 47.5	13 5.1	+ 2 9.5	-0.7589	0.6003	0.1126	-16 90
B. Sagittarii	5.9	+4.49	+ 0.3	-26 3.0	14 56.4	+ 3 56.2	+0.7096	0.5990	+0.1181	+64 -3
Sagittarii	4.9	4.47	0.7	25 24.2	15 49.1	+ 4 46.7	+0.1706	0.5985	0.1207	+33 -34
B. Sagittarii	6.1	4.44	0.8	24 19.5	15 50.1	+ 4 47.6	-0.9029	0.5985	0.1207	-24 90
Sagittarii	4.9	4.46	1.8	24 40.4	19 30.9	+ 8 19.3	-0.0910	0.5958	0.1314	+21 -49
Sagittarii	5.5	4.44	1.9	24 7.7	19 36.6	+ 8 24.8	-0.6221	0.5957	0.1317	- 6 -89
Sagittarii	5.8	+4.48	+ 3.0	-24 54.3	23 37.7	-11 43.9	+0.7040	0.5926	+0.1428	+65 -4
Sagittarii	4.7	4.49	3.1	25 4.3	23 53.1	-11 29.2	+0.9066	0.5924	0.1435	+65 + 9
Sagittarii	6.3	4.43	3.5	23 37.3	1 6.6	-10 18.7	-0.3636	0.5915	0.1469	+ 9 -66
B. Sagittarii	6.1	4.44	3.6	23 37.4	1 13.4	-10 12.2	-0.3444	0.5914	0.1472	+10 -65
B. Sagittarii	6.3	4.46	4.9	24 9.1	6 44.6	+ 4 54.3	+1.0369	0.5867	0.1615	+66 +18
B. Sagittarii	6.1	+4.42	+ 6.0	-22 58.2	9 33.2	+ 2 12.3	+0.3186	0.5843	+0.1685	+46 -26

ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

JULY.

THE STAR'S					AT CONJUNCTION IN R. A.					Limit- ingPar- allels.
Name.	Mag.	Red'ns from 1915.0.		Apparent Declina- tion.	Washington Mean Time.	Hour Angle, H	Y	x'	y'	N. S.
		$\Delta\alpha$	$\Delta\delta$							
		s	"	"	d h m	h m				
336 B. Sagittarii	6.5	+4.41	+6.2	-22 50.0	25 10 29.2	-1 18.6	+0.3395	0.5834	+0.1707	+48-25
4 Capricorni	5.7	4.39	7.8	22 4.3	16 13.0	+4 11.9	+0.5941	0.5782	0.1840	+63-11
v Capricorni	5.3	4.25	10.1	18 26.1	26 1 18.3	-11 3.6	-1.3003	0.5696	0.2030	-49-81
81 B. Capricorni	6.4	4.24	11.0	18 20.8	5 12.1	-7 18.5	-0.5858	0.5659	0.2102	+4-82
19 Capricorni	5.7	4.22	11.6	18 14.6	7 31.1	-5 4.6	-0.1997	0.5636	0.2144	+24-35
21 Capricorni	6.5	+4.21	+12.2	-17 51.6	10 6.8	-2 34.5	-0.0248	0.5612	+0.2187	+34-45
6 Capricorni	4.2	4.19	12.6	17 34.1	12 18.1	-0 27.9	+0.1631	0.5591	0.2223	+44-35
URANUS	6.0	...	...	17 16.4	14 54.0	+2 2.4	+0.4480	0.5583	0.2268	+60-20
114 B. Capricorni	6.1	4.17	13.6	17 41.6	16 17.6	+3 23.1	+1.1909	0.5555	0.2283	+72-28
29 Capricorni	5.5	4.11	13.4	15 31.3	16 35.6	+3 40.4	-0.9415	0.5551	0.2288	-14-30
42 Capricorni	5.1	+4.02	+15.5	-14 25.4	27 4 8.5	-9 10.6	+0.6723	0.5446	+0.2436	+75-8
44 Capricorni	6.0	4.03	15.8	14 47.1	4 49.7	-8 30.8	+1.2087	0.5440	0.2443	+75-28
151 B. Capricorni	6.1	3.97	16.2	13 6.9	7 52.4	-5 34.3	+0.2546	0.5414	0.2475	+53-10
150 B. Aquarii	6.0	3.80	17.8	9 27.5	20 40.0	+6 48.1	-0.2561	0.5313	0.2580	-28-38
μ Aquarii	5.3	3.77	17.9	8 14.6	22 15.7	+8 20.8	-1.0955	0.5301	0.2590	-19-30
170 B. Aquarii	6.0	+3.75	+18.0	-7 37.2	23 52.4	+9 54.4	-1.3220	0.5290	+0.2600	-39-85
186 B. Aquarii	6.1	3.72	18.3	6 59.1	28 3 37.9	-10 27.3	-0.9991	0.5264	0.2620	-12-30
167 G. Aquarii	6.3	3.72	19.1	8 20.0	7 4.6	-7 7.1	+1.3025	0.5241	0.2635	+82-35
67 Aquarii	6.4	3.68	19.3	7 24.2	9 28.9	-4 47.3	+0.9740	0.5226	0.2644	+83-9
252 B. Aquarii	5.8	3.61	19.6	5 26.1	15 25.3	+0 58.1	+0.5085	0.5191	0.2660	+73-17
197 G. Aquarii	6.3	+3.60	+19.7	-5 15.5	16 28.7	+1 59.6	+0.6065	0.5185	+0.2662	+80-12
263 B. Aquarii	6.1	3.58	19.9	5 9.8	18 36.3	+4 3.3	+1.0744	0.5174	0.2666	+85-15
22 B. Piscium	6.4	3.43	19.9	0 10.2	29 5 47.6	-9 5.5	-1.1642	0.5122	0.2669	-21-30
16 Piscium	5.7	3.37	19.9	+1 38.2	12 25.3	-2 39.7	-1.3027	0.5098	0.2659	-34-88
λ Piscium	4.6	3.35	20.1	1 19.1	15 21.1	+0 10.9	-0.1901	0.5088	0.2652	+33-54
19 Piscium	5.4	+3.32	+19.9	+3 1.2	17 36.3	+2 22.2	-1.3940	0.5082	+0.2645	-47-18
22 Piscium	5.8	3.31	20.2	2 27.8	20 30.2	+5 11.0	-0.0402	0.5074	0.2636	-41-45
25 Piscium	6.2	3.31	20.5	1 37.4	21 5.0	+5 44.8	+1.0027	0.5073	0.2634	+90-12
51 Piscium	5.6	3.12	20.2	6 29.5	30 17 42.3	+1 46.1	+1.1551	0.5045	0.2523	+90-22
136 B. Piscium	6.5	3.07	19.5	8 53.8	22 20.3	+6 16.1	-0.2649	0.5044	0.2489	+30-58
75 Piscium	6.3	+2.97	+18.7	+12 30.4	31 11 37.8	-4 49.4	-0.9282	0.5054	+0.2372	-7-77

AUGUST.

η Piscium	3.7	+2.88	+17.9	+14 54.8	1 0 35.8	+7 45.8	-0.5562	0.5078	+0.2234	+14-70
101 Piscium	6.2	+2.87	+18.1	+14 13.9	2 49.4	+9 55.5	+0.6796	0.5083	+0.2207	+90-1
105 Piscium	6.1	2.86	17.5	15 58.8	4 49.4	+11 52.0	-0.7862	0.5088	0.2183	+1-74
3 Arietis	6.4	2.83	17.1	16 59.5	8 22.3	-8 41.4	-1.1254	0.5098	0.2130	-21-73
4 Arietis	5.8	2.83	17.2	16 32.3	9 11.6	-7 53.6	-0.4536	0.5100	0.2128	+10-02
1 Arietis	5.1	2.80	16.9	17 24.5	13 52.7	-3 20.9	-0.4229	0.5114	0.2066	+21-30
35 B. Arietis	6.4	+2.77	+16.6	+17 51.0	17 6.9	-0 12.5	-0.2459	0.5125	+0.2022	+30-48
47 B. Arietis	6.5	2.76	16.7	17 37.8	19 10.4	+1 47.3	+0.4080	0.5132	0.1992	+68-14
15 Arietis	5.9	2.76	16.1	19 6.3	20 36.2	+3 50.5	-0.9248	0.5138	0.1972	-8-71
6 Arietis	5.6	2.73	15.9	19 30.8	2 03.1	+6 10.6	-0.6391	0.5151	0.1916	+0-49
26 Arietis	6.2	2.69	15.7	19 29.0	6 38.6	-11 5.4	+0.5627	0.5176	0.1819	+81-4
v Arietis	5.4	+2.67	+14.8	+21 35.9	10 41.0	-7 10.4	-1.0444	0.5193	+0.1753	-18-68
e Arietis (mean)	4.6	2.59	14.6	21 0.3	20 42.1	+2 31.9	+1.2813	0.5236	0.1581	+81-40
64 Arietis	5.8	2.54	12.7	24 25.6	8 44.9	-9 48.2	-0.7290	0.5290	0.1355	+2-66
7 Tauri	5.9	2.50	12.6	24 11.0	13 34.3	-5 8.1	+0.1706	0.5311	0.1259	+53-18
11 Tauri	6.1	2.49	12.1	25 3.5	16 32.8	-2 15.4	-0.4326	0.5324	0.1198	+19-49
16 Tauri	5.4	+2.46	+12.3	+24 1.6	18 27.5	-0 24.5	+0.9357	0.5333	+0.1158	+90-23
17 Tauri	3.8	2.46	12.3	23 51.0	18 29.7	-0 22.4	+1.1347	0.5333	0.1158	+90-40
18 Tauri	5.6	2.46	12.1	24 34.6	18 37.1	-0 15.1	+0.3447	0.5333	0.1155	+65-8
9 Tauri	4.3	2.46	12.2	24 12.3	18 38.7	-0 13.6	+0.7595	0.5333	0.1154	+90-15
20 Tauri	4.1	2.46	12.2	24 6.4	18 56.3	+0 3.4	+0.9023	0.5335	0.1148	+90-23
21 Tauri	5.8	+2.46	+12.2	+24 17.6	18 58.4	+0 5.4	+0.6993	0.5335	+0.1147	+90-10

[Eph 15]

ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

AUGUST.

THE STAR'S					AT CONJUNCTION IN R. A.					Limiting Parallels.	
Name.	Mag.	Red'ns from 1915.0.		Apparent Declination.	Washington Mean Time.	Hour Angle, H	Y	x'	y'	N.	S.
		$\Delta\alpha$	$\Delta\delta$								
		s	"	"	d h m	h m				"	"
Tauri	6.5	+2.46	+12.2	+24 16.0	8 19 2.3	0 9.2	+0.7362	0.5335	+0.1146	+90	+13
Tauri	3.0	2.45	12.3	23 50.8	19 43.2	0 48.7	+1.2792	0.5338	0.1132	+75	+56
H. Tauri	5.3	2.46	11.6	25 19.6	21 1.3	2 4.3	-0.2143	0.5344	0.1105	+31	-36
Tauri	5.6	2.40	10.7	26 15.8	4 6 32.5	+11 16.6	-0.2068	0.5383	0.0808	+26	-39
Tauri	5.0	2.38	10.0	27 9.1	10 54.5	-8 30.2	-0.9098	0.5400	0.0800	-10	-63
Tauri	5.3	+2.35	+10.6	+25 26.0	11 57.4	-7 29.3	-1.0763	0.5404	+0.0776	+90	+39
B. Aurigæ	6.0	2.29	8.7	27 45.5	5 1 38.5	+5 44.0	-0.6547	0.5449	0.0456	+6	-58
B. Aurigæ	6.5	2.25	8.3	27 34.8	6 58.7	+10 53.1	-0.2485	0.5463	0.0327	+29	-30
B. Aurigæ	6.0	2.24	8.0	27 55.6	9 16.1	-10 54.1	-0.5627	0.5469	0.0271	+11	-50
B. Tauri	6.4	2.20	7.6	27 52.5	14 18.2	-6 2.5	-0.3992	0.5480	0.0147	+21	-38
Tauri	1.8	+2.20	+7.0	+28 32.3	16 39.5	-3 46.1	-1.1054	0.5483	+0.0089	-28	-61
B. Aurigæ	6.5	2.16	7.0	27 36.6	20 58.4	+0 23.9	-0.0633	0.5490	0.0018	+40	-18
B. Aurigæ	5.7	2.14	7.1	26 52.4	21 31.8	+0 56.1	+0.7475	0.5491	0.0032	+90	+24
B. Tauri	5.6	2.12	6.3	27 56.7	6 3 39.8	+6 51.4	-0.5009	0.5496	0.0185	+15	-45
Tauri	4.6	2.11	6.3	27 35.7	4 43.2	+7 52.6	-0.1354	0.5497	0.0211	+35	-23
B. Tauri	6.1	+2.09	+5.9	+27 34.2	8 8.2	+11 10.4	-0.1950	0.5499	-0.0296	+32	-27
Geminorum	5.7	1.92	3.9	25 29.0	7 8 24.6	+10 36.5	+0.6501	0.5480	0.0890	+90	+11
Geminorum	6.2	1.91	3.7	26 11.7	9 58.0	-11 53.4	-0.2695	0.5477	0.0927	+28	-37
Geminorum	6.3	1.92	3.6	26 1.9	10 15.9	-11 36.1	-0.1186	0.5477	0.0934	+37	-29
Geminorum	5.8	1.86	3.3	24 16.4	16 8.9	-5 55.1	+1.2138	0.5464	0.1071	+87	+48
Geminorum	6.1	+1.87	+3.0	+25 2.1	17 9.2	-4 56.9	+0.2725	0.5462	-0.1094	+60	-10
Geminorum	5.1	1.85	2.6	25 12.9	21 8.1	-1 6.1	-0.3789	0.5452	0.1185	+22	-46
B. Geminorum	6.3	1.82	2.0	24 33.1	8 3 52.7	+5 24.8	-0.5044	0.5433	0.1334	+15	-55
B. Geminorum	6.0	1.81	2.0	24 25.0	4 19.2	+5 50.3	-0.4160	0.5431	0.1344	+20	-50
B. Geminorum	6.3	1.79	2.1	23 13.0	5 9.3	+6 38.7	+0.7762	0.5428	0.1361	+90	+13
NEW MOON.											
Leonis	5.0	+1.55	-7.9	+4 4.3	12 6 32.3	+4 57.5	+0.1932	0.5163	-0.2659	+54	-33
Leonis	5.7	1.53	8.5	2 24.9	9 40.6	+8 5.9	+1.0656	0.5163	0.2671	+90	+14
Leonis	5.4	1.58	9.0	2 28.5	15 0.7	-10 49.4	-0.4013	0.5165	0.2687	+23	-66
Leonis	6.0	+1.57	-9.1	+2 6.8	15 50.4	-10 1.3	-0.2460	0.5166	-0.2689	+31	-57
B. Leonis	6.3	1.57	9.5	0 35.8	18 3.6	-7 52.1	+0.7423	0.5168	0.2693	+90	-5
Leonis	5.5	1.59	9.3	+1 52.3	18 25.7	-7 30.7	-0.6891	0.5168	0.2693	+8	-90
Leonis	4.5	1.60	10.2	-0 21.4	18 0 56.5	-1 11.7	-0.1203	0.5176	0.2700	+37	-50
B. Leonis	6.2	1.59	10.6	1 58.1	1 40.5	-0 29.1	+1.3598	0.5178	0.2700	+83	+41
B. Virginis	6.5	+1.69	-12.6	-5 15.0	19 33.0	-7 9.5	-0.0470	0.5223	-0.2670	+40	-46
Virginis	5.3	1.75	14.2	8 59.2	14 5 58.4	+2 5.4	+1.2848	0.5260	0.2626	+81	+33
Virginis	4.8	1.79	13.9	7 31.9	7 44.9	+4 39.5	-0.9110	0.5272	0.2609	+6	-90
B. Virginis	6.0	1.84	15.3	11 11.5	14 58.2	+11 38.9	+0.9939	0.5308	0.2557	+79	+11
Virginis	5.0	1.86	14.7	9 4.9	14 59.5	+11 40.2	-1.1838	0.5308	0.2557	-26	-90
Virginis	5.6	+2.06	-17.0	-14 55.8	15 8 56.1	+5 1.3	+0.3879	0.5418	-0.2373	+59	-23
Virginis	5.6	2.14	17.2	15 45.4	14 12.1	+10 6.6	+0.0013	0.5454	0.2304	+37	-43
Virginis	6.1	2.14	17.3	15 20.7	14 41.8	+10 35.3	-0.5331	0.5458	0.2297	+10	-77
H. Virginis	5.5	2.35	17.9	17 48.6	16 3 50.7	-0 43.5	-0.9037	0.5557	0.2090	-14	-90
G. Virginis	6.4	2.36	18.1	18 11.7	4 33.5	-0 2.2	-0.6588	0.5562	0.2077	0	-90
G. Virginis	5.7	+2.37	-18.1	-18 19.7	5 14.4	+0 37.3	-0.6656	0.5568	-0.2065	0	-90
G. Libræ	6.5	2.50	18.4	20 4.3	12 9.0	+7 16.9	-0.2715	0.5622	0.1935	+19	-59
G. Libræ	6.4	2.58	18.6	20 49.3	16 54.6	+11 52.0	-0.4075	0.5661	0.1838	+11	-69
G. Libræ	6.1	2.60	18.5	20 58.4	17 20.6	-11 42.9	-0.3316	0.5664	0.1829	+15	-63
B. Libræ	5.7	2.72	19.4	21 2.3	21 32.6	-7 40.4	-1.0147	0.5697	0.1738	-25	-90
G. Libræ	6.1	+2.76	-18.3	-21 42.4	17 1 15.7	-4 5.7	-0.9663	0.5727	-0.1653	-23	-90
G. Libræ	5.8	2.83	18.1	22 5.4	5 17.4	-0 13.2	-1.2232	0.5758	0.1558	-45	-88
B. Libræ	6.3	2.99	18.2	24 12.4	11 58.3	+6 12.1	-0.0632	0.5808	0.1390	+23	-47
Libræ	5.0	3.04	17.6	23 32.8	14 47.9	+8 55.0	-1.1126	0.5828	0.1315	-37	-90
Scorpii	4.7	3.15	17.8	25 29.9	18 57.9	-11 4.9	+0.3376	0.5856	0.1202	+43	-25
Scorpii	4.6	+3.17	-17.5	-25 4.7	19 59.8	-10 5.5	-0.2097	0.5864	-0.1174	+14	-56

ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

AUGUST.

THE STAR'S					AT CONJUNCTION IN R. A.							Limit- ing Par- allels.
Name.	Mag.	Red'ns from 1915.0.		Apparent Declina- tion.	Washington Mean Time.	Hour Angle, H	Y	x'	y'	N	S	
		Δα	Δδ									
		s	"	'	d h m	h m						
31 B. Scorpii	5.4	+3.16	-17.2	-24 17.1	17 20 7.1	9 58.5	-1.0265	0.5864	-0.1170	32	00	
3 Scorpii	5.9	3.17	17.4	24 59.8	20 24.3	9 41.0	-0.3398	0.5866	0.1162	+7	05	
4 Scorpii	5.7	3.20	17.8	26 1.3	20 43.2	9 23.8	+0.6591	0.5868	0.1153	+61	6	
40 B. Scorpii	5.4	3.20	17.1	24 35.5	21 56.0	8 13.9	-0.9244	0.5876	0.1119	-26	00	
π Scorpii	3.0	3.22	17.6	25 52.5	22 1.3	8 8.9	+0.3638	0.5877	0.1117	+43	23	
48 B. Scorpii	4.9	+3.25	-17.2	-25 38.0	23 45.8	6 28.6	-0.0705	0.5888	-0.1067	+20	48	
50 B. Scorpii	6.4	3.24	16.8	24 29.8	23 59.8	6 15.2	-1.2443	0.5889	0.1061	-53	81	
65 B. Scorpii	5.5	3.31	17.1	26 6.2	1 35.7	4 43.1	+0.2142	0.5899	0.1015	+34	31	
85 B. Scorpii	6.0	3.34	16.4	25 16.0	4 12.3	2 12.9	-0.8872	0.5914	0.0938	-25	90	
σ Scorpii	3.1	3.39	16.0	25 23.7	6 36.5	0 5.4	-0.9747	0.5927	0.0867	-32	00	
α Scorpii	1.2	+3.47	-15.8	-26 14.9	9 43.3	3 4.5	-0.3668	0.5943	-0.0773	+2	67	
116 B. Scorpii	6.2	3.49	15.7	26 21.5	10 28.1	3 47.5	-0.3135	0.5946	0.0750	+5	63	
τ Scorpii	2.9	3.56	16.0	28 2.7	12 8.8	5 24.1	+1.2683	0.5954	0.0698	+62	32	
134 B. Scorpii	6.4	3.61	15.1	27 18.1	15 10.6	8 26.9	+0.3112	0.5968	0.0599	+36	26	
118 B. Ophiuchi	6.2	3.76	13.1	26 24.2	23 48.1	7 25.8	-0.9898	0.5995	0.0330	-37	00	
95 G. Ophiuchi	6.1	+3.83	-13.1	-27 39.7	1 50.7	5 28.3	+0.2187	0.6000	-0.0264	+29	31	
36 Ophi. (1st star)	5.4	3.80	13.1	26 29.0	2 58.3	4 23.5	-0.9973	0.6002	0.0228	-39	00	
43 Ophiuchi	5.4	3.92	12.3	28 3.9	5 54.6	1 34.6	+0.5446	0.6007	0.0133	+47	12	
163 G. Ophiuchi	6.3	4.05	10.4	27 50.8	13 19.2	5 31.3	+0.3162	0.6012	-0.0109	+33	25	
X Sagittarii (var.)	4.4	4.08	10.0	27 48.1	14 54.3	7 2.3	+0.2925	0.6012	+0.0161	+31	27	
4 G. Sagittarii	6.2	+4.06	-9.6	-26 56.9	15 15.2	7 22.4	-0.5620	0.6011	+0.0172	-13	83	
10 G. Sagittarii	5.7	4.15	9.1	28 3.3	18 17.8	+10 17.3	+0.6202	0.6009	0.0272	+54	8	
38 B. Sagittarii	4.7	4.23	8.2	28 28.2	22 31.9	9 39.3	+1.1823	0.6003	0.0408	+62	36	
48 G. Sagittarii	6.3	4.28	7.3	28 19.1	2 0.4	6 19.6	+1.1917	0.5995	0.0520	+62	37	
66 B. Sagittarii	4.7	4.24	6.7	27 4.6	2 16.6	6 4.0	-0.0464	0.5995	0.0529	+16	40	
68 G. Sagittarii	6.2	+4.28	-5.6	-26 41.3	5 54.7	2 35.0	-0.2246	0.5985	+0.0644	+8	57	
69 G. Sagittarii	6.3	4.29	5.6	26 48.6	6 3.0	2 27.1	-0.0918	0.5984	0.0648	+15	49	
86 B. Sagittarii	6.5	4.28	5.5	26 38.3	6 22.2	2 8.7	-0.2443	0.5983	0.0658	+8	38	
φ Sagittarii	3.3	4.39	3.8	27 4.8	12 39.9	3 53.4	+0.6772	0.5959	0.0853	+61	5	
σ Sagittarii	2.1	4.40	2.6	26 24.2	16 19.8	7 24.3	+0.3290	0.5942	0.0664	+40	25	
162 B. Sagittarii	6.4	+4.36	-1.9	-24 59.5	17 31.6	8 33.1	-0.9780	0.5936	+0.1000	-31	00	
127 G. Sagittarii	6.4	4.38	1.6	25 3.7	18 19.0	9 18.5	-0.8275	0.5932	0.1023	-21	00	
172 B. Sagittarii	5.8	4.38	1.5	24 57.9	19 6.4	+10 4.0	-0.8430	0.5928	0.1047	-21	00	
189 B. Sagittarii	6.1	4.40	0.7	24 47.5	21 19.7	11 48.1	-0.7791	0.5916	0.1111	-17	00	
201 B. Sagittarii	5.9	4.47	0.5	26 3.0	23 14.0	9 58.5	+0.7083	0.5905	0.1166	+64	1	
ψ Sagittarii	4.9	+4.45	-0.1	-25 24.3	21 0 8.1	9 6.6	+0.1627	0.5899	+0.1192	+33	34	
208 B. Sagittarii	6.1	4.42	+0.1	24 19.5	0 9.2	9 5.5	-0.9243	0.5899	0.1192	-25	00	
χ Sagittarii	4.9	4.46	1.2	24 40.5	3 55.9	5 28.0	-0.1016	0.5876	0.1297	+20	40	
49 Sagittarii	5.5	4.44	1.3	24 7.8	4 1.6	5 22.4	-0.6392	0.5876	0.1300	-7	00	
51 Sagittarii	5.8	4.50	2.3	24 54.3	8 9.0	1 24.9	+0.7035	0.5848	0.1411	+65	4	
h Sagittarii	4.7	+4.52	-2.4	-25 4.3	8 24.8	1 9.7	+0.9086	0.5846	+0.1418	+65	9	
53 Sagittarii	6.3	4.47	3.0	23 37.3	9 40.1	0 2.6	-0.3765	0.5837	0.1451	+8	07	
274 B. Sagittarii	6.1	4.47	3.0	23 37.4	9 47.1	0 9.3	-0.3570	0.5836	0.1454	+0	05	
308 B. Sagittarii	6.3	4.53	4.3	24 9.1	15 26.3	5 35.3	+1.0407	0.5796	0.1597	+66	10	
329 B. Sagittarii	6.1	4.51	5.6	22 58.2	18 18.9	8 21.2	+0.3147	0.5774	0.1667	+46	26	
336 B. Sagittarii	6.5	+4.51	+5.9	-22 50.0	19 16.1	9 16.2	+0.3358	0.5766	+0.1689	+47	25	
4 Capricorni	5.7	4.51	7.5	22 4.1	21 1 7.4	9 5.8	-0.5935	0.5720	0.1822	+63	11	
υ Capricorni	5.3	4.42	10.5	18 26.3	10 23.2	+0 10.7	-1.3175	0.5645	0.2012	-51	78	
81 B. Capricorni	6.4	4.43	11.5	18 20.8	14 21.1	3 38.6	-0.5960	0.5612	0.2086	+4	83	
19 Capricorni	5.7	4.44	12.1	18 14.6	16 42.3	3 54.6	-0.2065	0.5593	0.2128	+24	55	
21 Capricorni	6.5	+4.43	+12.8	-17 51.6	19 20.4	8 27.1	-0.0299	0.5571	+0.2173	+34	45	
6 Capricorni	4.2	4.43	13.3	17 34.1	21 33.7	+10 35.7	+0.1595	0.5554	0.2209	+44	35	
URANUS	6.0	...	...	17 35.0	22 17.8	+11 18.2	+0.3382	0.5564	0.2225	+54	25
114 B. Capricorni	6.1	4.43	14.2	17 41.6	1 36.3	9 30.2	+1.1943	0.5520	0.2271	+72	28	
29 Capricorni	5.5	4.37	14.5	15 31.3	1 54.6	9 12.6	-0.9525	0.5518	0.2275	-15	00	
42 Capricorni	5.1	+4.34	+16.8	-14 25.3	13 34.8	+2 3.6	+0.6709	0.5428	+0.2428	+75	8	

ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

AUGUST.

THE STAR'S				AT CONJUNCTION IN R. A.							Limiting Parallels.			
Mag.	Red'n's from 1915.0.		Apparent Declination.	Washington Mean Time.			Hour Angle, H	Y	x'	y'	N.	S.		
	$\Delta\alpha$	$\Delta\delta$		d	h	m								
	s	"	"	d	h	m	h	m			"	"		
ii	6.0	+4.35	+17.1	-14	47.0	23	14	16.3	+ 2 43.7	+1.2101	0.5423	+0.2435	+75	+28
ii	6.1	4.30	17.8	13	6.9		17	20.4	+ 5 41.7	+0.2513	0.5401	0.2468	+53	-30
	6.0	4.20	20.1	9	27.5	24	6	11.6	- 5 52.3	-0.2616	0.5314	0.2580	+28	-58
	5.3	4.18	20.4	8	14.6		7	47.5	- 4 19.4	-1.1030	0.5303	0.2591	-19	-90
	6.0	4.15	20.6	7	37.1		9	24.3	- 2 45.7	-1.3298	0.5294	0.2601	-40	-86
	6.1	+4.14	+21.1	- 6	59.0		13	10.0	+ 0 52.9	-1.0059	0.5272	+0.2623	-12	-90
	6.3	4.16	21.7	8	20.0		16	36.6	+ 4 12.9	+1.2984	0.5252	0.2640	+82	+35
	6.4	4.13	22.0	7	24.1		19	0.6	+ 6 32.4	+0.9689	0.5239	0.2650	+83	+ 9
	5.8	4.08	22.7	5	26.1	25	0	56.0	-11 43.2	+0.5020	0.5213	0.2669	+73	-18
	6.3	4.08	22.8	5	15.5		1	59.2	-10 42.0	+ .5997	0.5206	0.2672	+79	-12
	6.1	+4.07	+23.0	- 5	9.7		4	6.3	- 8 38.7	+1.0671	0.5196	+0.2676	+85	+15
	6.4	3.96	23.8	0	10.1		15	13.4	+ 2 8.2	-1.1704	0.5153	0.2683	-22	-90
	6.4	3.96	24.3	- 1	32.9		19	31.1	+ 6 18.1	+1.4293	0.5139	0.2679	+68	+57
	5.7	3.91	24.1	+ 1	38.2		21	47.7	+ 8 30.7	-1.3090	0.5132	0.2675	-35	-88
	4.6	3.91	24.2	1	19.1	26	0	41.8	+11 19.6	-0.1995	0.5125	0.2669	+33	-54
	5.4	+3.88	+24.3	+ 3	1.3		2	55.6	-10 30.5	-1.4003	0.5120	+0.2664	-48	-76
	5.8	3.88	24.5	2	27.9		5	47.7	- 7 43.5	-0.0509	0.5114	0.2655	+41	-46
	6.2	3.89	24.6	1	37.5		6	22.1	- 7 10.2	+0.9884	0.5112	0.2653	+90	+ 9
	5.6	3.78	24.8	6	29.6	27	2	43.8	-11 24.5	+1.1344	0.5092	0.2544	+90	+21
	6.5	3.75	24.4	8	53.9		7	17.9	- 6 58.4	-0.2798	0.5092	0.2510	+29	-57
	6.3	+3.70	+23.7	+12	30.4		20	23.9	+ 5 44.6	-0.9426	0.5102	+0.2393	- 8	-77
	3.7	3.65	22.9	14	54.9	28	9	10.7	- 5 51.5	-0.5755	0.5124	0.2251	+13	-70
	6.2	3.64	23.0	14	14.0		11	22.4	- 4 43.7	+0.6534	0.5129	0.2225	+88	- 4
	6.1	3.64	22.5	15	58.9		13	20.7	- 1 49.0	-0.8053	0.5134	0.2200	0	-74
	6.4	3.63	22.1	16	59.6		16	50.7	+ 1 34.8	-1.1436	0.5142	0.2155	-23	-73
	5.8	+3.62	+22.2	+16	32.3		17	39.4	+ 2 22.0	-0.4755	0.5144	+0.2144	+18	-63
	5.1	3.60	21.7	17	24.5		22	16.7	+ 6 50.9	-0.4459	0.5157	0.2081	+20	-60
	6.4	3.59	21.4	17	51.1	29	1	28.4	+ 9 56.8	-0.2705	0.5166	0.2035	+29	-50
	6.5	3.57	21.4	17	37.9		3	30.4	+11 55.1	+0.3806	0.5172	0.2006	+66	-16
	5.9	3.59	20.9	19	6.3		4	55.1	-10 42.8	-0.9470	0.5177	0.1985	-10	-71
	5.6	+3.56	+20.6	+19	30.9		8	39.2	- 7 5.6	-0.6635	0.5189	+0.1928	+ 8	-70
	6.2	3.54	20.2	19	29.1		14	50.5	- 1 5.7	+0.5316	0.5210	0.1829	+78	- 6
	5.4	3.54	19.2	21	36.0		18	50.3	+ 2 46.7	-1.0693	0.5224	0.1762	-20	-68
nean)	4.6	3.47	18.6	21	0.4	30	4	45.9	-11 36.5	+1.2453	0.5261	0.1586	+86	+45
	5.8	3.45	16.4	24	25.7		16	43.5	- 0 1.9	-0.7599	0.5307	0.1357	-0	-66
	5.9	+3.42	+16.0	+24	11.1		21	31.3	+ 4 36.5	+0.1362	0.5325	+0.1260	+51	-20
	6.1	3.41	15.4	25	3.6	31	0	28.9	+ 7 28.5	-0.4657	0.5335	0.1199	+17	-51
	5.4	3.38	15.5	24	1.6		2	23.2	+ 9 19.0	+0.8989	0.5342	0.1159	+90	+22
	3.8	3.38	15.5	23	51.1		2	25.3	+ 9 21.0	+1.0974	0.5342	0.1158	+90	+36
	5.6	3.39	15.3	24	34.7		2	32.7	+ 9 28.2	+0.3093	0.5343	0.1156	+62	-10
	4.3	+3.38	+15.4	+24	12.4		2	34.3	+ 9 29.7	+0.7231	0.5343	+0.1155	+90	+12
	4.1	3.38	15.4	24	6.4		2	51.8	+ 9 40.7	+0.8655	0.5344	0.1149	+90	+20
	5.8	3.38	15.3	24	17.7		2	53.9	+ 9 48.7	+0.6631	0.5344	0.1148	+90	+ 9
	6.5	3.38	15.3	24	16.1		2	57.9	+ 9 52.6	+0.6909	0.5344	0.1147	+90	+11
	3.0	3.37	15.4	23	50.8		3	38.5	+10 31.8	+1.2415	0.5347	0.1132	+83	+51
	5.2	+3.36	+15.3	+23	52.9		4	26.2	+11 17.9	+1.2025	0.5350	+0.1115	+70	+60
	5.3	3.38	14.7	25	19.7		4	56.4	+11 47.1	-0.2486	0.5352	0.1104	+29	-38
	5.6	3.33	13.3	26	15.8		14	26.1	- 3 2.0	-0.3322	0.5384	0.0807	+25	-41
	5.0	3.32	12.4	27	9.1		18	47.7	+ 1 10.8	-0.9447	0.5398	0.0708	-13	-63
	5.3	+3.28	+12.9	+25	26.0		19	50.6	+ 2 11.5	+1.0385	0.5401	+0.0774	+90	+36

SEPTEMBER.

6.0	+3.22	+10.3	+27 45.5	1	9	32.3	- 8 34.5	-0.6914	0.5437	+0.0454	-4	-60
6.5	3.17	9.6	27 34.8		14	53.2	- 3 24.7	-0.2857	0.5448	0.0325	+27	-33
6.0	+3.16	+ 9.2	+27 55.6		17	10.9	- 1 11.7	-0.5998	0.5453	+0.0270	-9	-57

[Eph 13]

ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

SEPTEMBER.

THE STAR'S					AT CONJUNCTION IN R. A.				
Name.	Mag.	Red'ns from 1915.0.		Apparent Declination.	Washington Mean Time.	Hour Angle, <i>H</i>	<i>Y</i>	<i>x'</i>	<i>y'</i>
		$\Delta\alpha$	$\Delta\delta$						
		<i>s</i>	<i>"</i>	<i>°</i>	<i>d</i>	<i>h</i>	<i>m</i>		
354 B. Tauri	6.4	+3.11	+8.5	+27 52.5	1 22 14.0	+3 41.1	-0.4365	0.5460	+0.0147
β Tauri	1.8	3.11	7.8	28 32.3	2 0 35.8	+5 58.0	-1.1428	0.5464	+0.0080
107 B. Aurigæ	6.5	3.05	7.5	27 36.6	4 55.9	+10 9.2	-0.1006	0.5468	-0.0018
112 B. Aurigæ	5.7	3.03	7.7	26 52.4	5 29.3	+10 41.4	+0.7103	0.5469	0.0031
406 B. Tauri	5.0	3.00	6.5	27 56.7	11 39.1	-7 21.6	-0.5381	0.5472	-0.0183
136 Tauri	4.6	+2.98	+6.4	+27 35.7	12 42.8	-6 20.0	-0.1724	0.5473	-0.0309
415 B. Tauri	6.1	2.95	6.0	27 34.2	16 8.9	-3 1.0	-0.2319	0.5473	-0.0204
37 Geminorum	5.7	2.68	3.0	25 29.0	3 16 33.5	-3 26.9	+0.6162	0.5454	0.0884
39 Geminorum	6.2	2.67	2.6	26 11.7	18 7.4	-1 56.2	-0.3034	0.5450	-0.0921
40 Geminorum	6.3	2.67	2.6	26 1.9	18 25.5	-1 38.8	-0.1525	0.5450	-0.0928
48 Geminorum	5.8	+2.58	+2.2	+24 16.3	4 0 20.2	+4 3.9	+1.1813	0.5438	-0.1064
52 Geminorum	6.1	2.59	1.8	25 2.0	1 20.9	+5 2.5	+0.2399	0.5436	-0.1087
A Geminorum	5.1	2.55	1.2	25 12.9	5 21.0	+8 54.5	-0.4106	0.5427	-0.1177
176 B. Geminorum	6.3	2.48	0.4	24 33.1	12 7.3	-8 32.9	-0.5342	0.5410	-0.1320
181 B. Geminorum	6.0	2.48	0.4	24 25.0	12 34.0	-8 7.1	-0.4457	0.5410	-0.1335
187 B. Geminorum	6.3	+2.44	+0.6	+23 13.0	13 24.2	-7 18.6	+0.7463	0.5407	-0.1353
192 B. Geminorum	6.3	2.42	0.7	22 36.1	14 31.0	-6 14.0	+1.2631	0.5404	-0.1377
κ Geminorum	3.7	2.46	0.0	24 36.2	14 58.9	-5 47.1	-0.9770	0.5403	-0.1387
82 Geminorum	6.3	2.42	+0.1	23 21.1	16 53.9	-3 55.9	+0.1120	0.5398	-0.1428
5 B. Cancræ	6.4	2.38	-0.8	23 49.0	22 40.0	+1 38.6	-1.2489	0.5382	-0.1547
9 Cancræ	6.2	+2.34	-0.9	+22 52.7	5 1 8.8	+4 2.6	-0.6211	0.5374	-0.1596
μ Cancræ	5.5	2.32	0.8	21 49.7	1 50.5	+4 42.9	+0.4033	0.5372	-0.1610
49 B. Cancræ	6.0	2.26	1.4	21 1.0	7 45.0	+10 25.8	+0.2954	0.5355	-0.1724
η Cancræ	5.5	2.20	2.0	20 43.8	13 35.6	-7 55.1	-0.4354	0.5337	-0.1833
39 Cancræ	6.5	2.17	2.4	20 18.5	17 6.6	-4 31.0	-0.6362	0.5326	-0.1895
40 Cancræ	6.5	+2.17	-2.4	+20 16.3	17 9.1	-4 28.5	-0.6049	0.5326	-0.1860
102 B. Cancræ	6.5	2.16	2.3	19 58.2	17 14.3	-4 23.5	-0.2979	0.5326	-0.1897
ϵ Cancræ	6.3	2.16	2.3	19 50.7	17 16.8	-4 21.1	-0.1715	0.5327	-0.1898
δ Cancræ	4.2	2.12	2.4	18 28.0	19 18.9	-2 22.0	+0.9193	0.5320	-0.1933
139 B. Cancræ	6.1	2.12	2.8	19 9.0	22 12.2	+0 24.7	-0.3792	0.5311	-0.1982
X Cancræ (var.)	6.2	+2.08	-2.7	+17 33.3	6 0 26.6	+2 34.9	+0.8815	0.5305	-0.2010
π Cancræ	5.6	1.98	3.5	15 17.6	10 2.8	+11 52.6	+1.2803	0.5278	-0.2168
227 B. Cancræ	6.4	1.97	3.9	+15 43.9	12 58.2	-9 17.5	+0.1734	0.5271	-0.2210
NEW MOON.									
370 B. Virginis	6.0	+1.68	-13.6	-11 11.5	10 21 24.4	-4 7.4	+1.0482	0.5379	-0.2584
ψ Virginis	5.0	1.70	13.3	9 4.9	21 25.6	-4 6.3	-1.1091	0.5379	-0.2584
75 Virginis	5.6	1.82	15.1	14 55.8	11 14 59.5	-11 7.8	+0.4592	0.5484	-0.2395
83 Virginis	5.6	1.88	15.4	15 45.4	20 9.3	-6 8.8	+0.0786	0.5518	-0.2324
85 Virginis	6.1	1.88	15.4	15 20.7	20 38.5	-5 40.6	-0.4513	0.5521	-0.2317
43 H. Virginis	5.5	+2.03	-16.1	-17 48.5	12 9 33.6	+6 47.0	-0.8140	0.5611	-0.2105
231 G. Virginis	6.4	2.04	16.1	18 11.7	10 15.8	+7 27.6	-0.5704	0.5617	-0.2096
236 G. Virginis	5.7	2.05	16.2	18 19.6	10 50.0	+8 6.3	-0.5770	0.5622	-0.2088
9 G. Libræ	6.5	2.15	16.6	20 4.3	17 44.6	-9 20.1	-0.1829	0.5670	-0.1944
17 G. Libræ	6.4	2.22	16.7	20 49.2	22 26.6	-4 48.6	-0.3168	0.5704	-0.1844
18 G. Libræ	6.1	+2.23	-16.7	-20 58.4	22 52.3	-4 23.8	-0.2411	0.5707	-0.1831
43 B. Libræ	5.7	2.35	17.8	21 2.3	13 3 1.5	-0 24.1	-0.9201	0.5736	-0.1744
47 G. Libræ	6.1	2.37	16.7	21 42.4	6 42.4	+3 8.3	-0.8712	0.5761	-0.1655
64 G. Libræ	5.8	2.43	16.5	22 5.4	10 42.1	+6 58.8	-1.1269	0.5788	-0.1566
153 B. Libræ	6.3	2.57	16.7	24 12.4	17 20.3	-10 38.7	+0.0308	0.5830	-0.1304
42 Libræ	5.0	+2.62	-16.3	-23 32.8	20 9.1	-7 56.5	-1.0162	0.5846	-0.1317
b Scorpæ	4.7	2.72	16.5	25 29.9	14 0 18.3	-3 57.1	+0.4323	0.5869	-0.1202
A Scorpæ	4.6	2.73	16.3	25 4.7	1 20.1	-2 57.9	-0.1142	0.5875	-0.1174
31 B. Scorpæ	5.4	2.72	16.0	24 17.1	1 27.4	-2 50.9	-0.9302	0.5876	-0.1170
3 Scorpæ	5.9	2.74	16.2	24 59.8	1 44.5	-2 34.4	-0.2442	0.5876	-0.1161
4 Scorpæ	5.7	+2.76	-16.5	-26 1.2	2 3.4	-2 16.3	+0.7539	0.5879	-0.1111

ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

SEPTEMBER.

THE STAR'S					AT CONJUNCTION IN R. A.							Limiting Parallels.		
Name.	Mag.	Red'n's from 1915.0.		Apparent Declination.	Washington Mean Time.			Hour Angle, <i>H</i>		<i>Y</i>	<i>x'</i>	<i>y'</i>	<i>N.</i>	<i>S.</i>
		$\Delta\alpha$	$\Delta\delta$		d	h	m	h	m					
B. Scorpii	5.4	+2.76	-15.9	24 35.5	14	3	16.0	-1	6.6	-0.8282	0.5885	-0.1119	-19	-90
Scorpii	3.0	2.78	16.4	25 52.5		3	21.3	-1	1.5	+0.4591	0.5885	0.1117	+50	-18
B. Scorpii	4.9	2.81	16.0	25 38.0		5	5.8	+0	38.7	+0.0252	0.5894	0.1067	+25	-42
B. Scorpii	6.4	2.80	15.6	24 29.8		5	19.7	+0	52.1	-1.1481	0.5895	0.1060	-43	-90
B. Scorpii	5.5	2.86	16.0	26 6.2		6	55.6	+2	24.1	+0.3101	0.5902	0.1014	+40	-26
B. Scorpii	6.0	+2.89	-15.4	25 16.0		9	32.3	+4	54.5	-0.7912	0.5915	-0.0937	-19	-90
Scorpii	3.1	2.94	15.2	25 23.6		11	56.8	+7	13.1	-0.8790	0.5924	0.0865	-25	-90
Scorpii	1.2	3.02	15.0	26 14.9		15	4.0	+10	12.7	-0.2707	0.5936	0.0771	+7	-60
B. Scorpii	6.2	3.04	14.9	26 21.5		15	49.0	+10	55.8	-0.2173	0.5938	0.0748	+10	-56
B. Scorpii	6.4	3.16	14.5	27 18.1		20	41.8	-8	23.5	+0.4086	0.5953	0.0597	+42	-20
B. Ophiuchi	6.2	+3.31	-12.8	26 24.2	15	5	13.0	-0	12.6	-0.8966	0.5969	-0.0329	-31	-90
Ophiuchi	6.1	3.38	12.8	27 39.7		7	17.6	+1	45.9	+0.3161	0.5971	0.0264	+34	-25
Ophi. (1st star)	5.4	3.35	13.0	26 29.0		8	25.9	+2	51.4	-0.9048	0.5972	0.0227	-32	-90
Ophiuchi	5.4	3.47	12.2	28 3.9		11	24.0	+5	42.1	+0.6433	0.5973	0.0132	+55	-6
Ophiuchi	6.0	3.49	10.9	26 12.5		14	34.8	+8	45.0	-1.2620	0.5972	-0.0031	-63	-72
Ophiuchi	6.3	+3.61	-10.5	27 50.8		18	54.1	-11	6.5	+0.4133	0.5969	-0.0107	+39	-20
Sagittarii (var.)	4.4	3.64	10.2	27 48.1		20	30.5	-9	34.1	+0.3894	0.5967	0.0158	+37	-21
Sagittarii	6.2	3.63	9.8	26 56.9		20	51.7	-9	13.8	-0.4701	0.5966	0.0169	-8	-75
Sagittarii	5.7	3.72	9.5	28 3.3		23	57.0	-6	16.2	+0.7188	0.5961	0.0267	+62	-2
B. Sagittarii	4.7	3.83	7.2	27 4.6	16	8	3.7	+1	30.5	+0.0464	0.5939	0.0521	+21	-41
Sagittarii	6.2	+3.88	-6.2	26 41.3		11	45.7	+5	3.4	-0.1342	0.5925	+0.0634	+13	-51
Sagittarii	6.3	3.89	6.2	26 48.6		11	54.2	+5	11.6	-0.0003	0.5924	0.0638	+20	-43
Sagittarii	6.5	3.89	6.1	26 38.3		12	13.8	+5	30.4	-0.1542	0.5923	0.0648	+12	-52
B. Sagittarii	5.7	3.94	4.0	25 5.9		18	21.6	+11	23.2	-1.2655	0.5895	0.0832	-58	-75
Sagittarii	3.3	4.01	4.6	27 4.8		18	38.9	+11	39.9	+0.7732	0.5894	0.0840	+63	+1
Sagittarii	2.1	+4.05	-3.5	26 24.3		22	23.4	-8	44.7	+0.4209	0.5875	+0.0949	+46	-20
B. Sagittarii	6.4	4.02	2.7	24 59.5		23	36.7	-7	34.3	-0.8980	0.5868	0.0984	-25	-90
Sagittarii	6.4	4.03	2.4	25 3.7	17	0	25.1	-6	47.9	-0.7465	0.5864	0.1007	-15	-90
B. Sagittarii	5.8	4.04	2.4	24 57.9		1	13.5	-6	1.4	-0.7625	0.5859	0.1030	-16	-90
B. Sagittarii	6.1	4.07	1.6	24 47.5		3	29.7	-3	50.6	-0.6991	0.5846	0.1093	-12	-90
B. Sagittarii	5.9	+4.14	-1.5	26 3.0		5	26.5	-1	58.5	+0.8014	0.5834	+0.1147	+64	+3
Sagittarii	4.9	4.13	1.1	25 24.3		6	21.9	-1	5.3	+0.2503	0.5828	0.1172	+38	-29
B. Sagittarii	6.1	4.10	-0.7	24 19.5		6	23.0	-1	4.2	-0.8470	0.5828	0.1172	-20	-90
Sagittarii	4.9	+4.16	+0.2	24 40.5		10	14.9	+2	38.6	-0.0181	0.5803	0.1276	+25	-44
Sagittarii	5.5	4.14	0.4	24 7.8		10	20.8	+2	44.3	-0.5610	0.5802	0.1278	-3	-82
Sagittarii	5.8	+4.22	+1.3	24 54.3		14	34.0	+6	47.7	+0.7929	0.5773	+0.1387	+65	+2
Sagittarii	4.7	4.23	1.2	25 4.3		14	50.1	+7	3.1	+1.0000	0.5772	0.1394	+65	+16
Sagittarii	6.3	4.19	2.0	23 37.3		16	7.3	+8	17.3	-0.2986	0.5762	0.1426	+12	-61
B. Sagittarii	6.1	4.20	2.1	23 37.4		16	14.4	+8	24.2	-0.2790	0.5762	0.1429	+13	-60
B. Sagittarii	6.3	4.27	3.1	24 9.2		22	1.8	-10	1.7	+1.1301	0.5720	0.1570	+66	+26
B. Sagittarii	6.1	+4.27	+4.5	22 58.2	18	0	58.6	-7	11.5	+0.3948	0.5698	+0.1638	+51	-22
B. Sagittarii	6.5	4.27	4.9	22 50.0		1	57.2	-6	15.2	+0.4156	0.5690	0.1660	+53	-20
Capricorni	5.7	4.31	6.5	22 4.3		7	57.2	-0	28.5	+0.6722	0.5645	0.1790	+67	-6
Capricorni	5.3	4.27	9.8	18 26.1		17	26.8	+8	40.5	-1.2660	0.5571	0.1978	-44	-86
B. Capricorni	6.4	4.30	10.8	18 20.8		21	30.5	-11	24.5	-0.5398	0.5540	0.2051	+7	-78
Capricorni	5.7	+4.31	+11.4	-18 14.6		23	55.1	-9	5.0	-0.1481	0.5522	+0.2092	+27	-52
Capricorni	6.5	4.32	12.1	17 51.6	19	2	37.0	-6	28.7	+0.0280	0.5502	0.2136	+37	-42
URANUS	6.0	...	...	17 49.5		4	3.2	-5	5.4	+0.3018	0.5502	0.2162	+51	-27
Capricorni	4.2	4.32	12.7	17 34.1		4	53.4	-4	16.9	+0.2175	0.5484	0.2172	+47	-32
B. Capricorni	6.1	4.35	13.6	17 41.6		9	1.8	-0	17.0	+1.2595	0.5454	0.2233	+72	+35
Capricorni	5.5	+4.29	+14.1	-15 31.3		9	20.4	+0	0.9	-0.9101	0.5452	+0.2238	-12	-90
Capricorni	5.1	4.32	16.6	14 25.4		21	16.1	+11	32.7	+0.7181	0.5369	0.2300	+76	-5
Capricorni	6.0	4.34	16.9	14 47.0		21	58.5	-11	46.3	+1.2620	0.5365	0.2308	+75	+33
B. Capricorni	6.1	4.30	17.8	13 6.9	20	1	6.4	-8	44.6	+0.2902	0.5344	+0.2432	+55	-28
B. Aquarii	6.0	4.26	20.6	9 27.5		14	12.2	+3	56.0	-0.2424	0.5268	0.2540	+29	-57
Aquarii	5.3	+4.24	+21.1	-8 14.6		15	49.8	+5	30.6	-1.0929	0.5229	+0.2557	-19	-96

ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

SEPTEMBER.

THE STAR'S					AT CONJUNCTION IN R. A.							Limit- ing Pa- allels
Name.	Mag.	Red'ns from 1915.0.		Apparent Declina- tion.	Washington Mean Time.	Hour Angle, H	Y	x'	y'	N. S.		
		$\Delta\alpha$	$\Delta\delta$									
		s	"	°	'	d	h	m	h	m		
170 B. Aquarii	6.0	+4.23	+21.5	-7 37.1	20	17 28.2	+5 5.9	-1.3233	0.5251	+0.2568	-40-80	
186 B. Aquarii	6.1	4.23	22.0	6 59.0	21	17 5	+10 48.1	-1.0012	0.5232	0.2591	-12-90	
167 G. Aquarii	6.3	4.27	22.4	8 20.0	21	0 47.3	-9 48.6	+1.3169	0.5216	0.2609	+82-37	
67 Aquarii	6.4	4.26	22.9	7 24.1	3	13.4	-7 27.0	+0.9816	0.5206	0.2620	+83-10	
252 B. Aquarii	5.8	4.23	23.9	5 26.0	9	13.5	-1 37.8	+0.5032	0.5182	0.2642	+73-17	
197 G. Aquarii	6.3	+4.23	+24.0	-5 15.5	10	17.4	-0 35.9	+0.6001	0.5178	+0.2644	+80-12	
263 B. Aquarii	6.1	4.24	24.3	5 9.7	12	26.0	+1 28.8	+1.0676	0.5171	0.2650	+85-15	
22 B. Piscium	6.4	4.18	25.8	0 10.1	23	39.6	-11 37.7	-1.1983	0.5138	0.2662	-24-90	
13 Piscium	6.4	4.21	26.2	-1 32.9	22	3 59.3	-7 25.8	+1.4088	0.5128	0.2660	+75-51	
16 Piscium	5.7	4.17	26.5	+1 38.3	6	16.8	-5 12.4	-1.3455	0.5124	0.2657	-40-85	
λ Piscium	4.6	+4.18	+26.6	+1 19.2	9	12.0	-2 22.4	-0.2349	0.5119	+0.2653	+31-57	
22 Piscium	5.8	4.18	27.0	2 27.9	14	19.3	+2 35.9	-0.0927	0.5112	0.2641	+38-48	
25 Piscium	6.2	4.19	27.0	1 37.5	14	53.9	+3 9.4	+0.9498	0.5111	0.2638	+90-7	
51 Piscium	5.6	4.18	27.9	6 29.6	23	11 17.4	-1 2.9	+1.0669	0.5107	0.2538	+90-10	
136 B. Piscium	6.5	4.17	27.8	8 53.9	15	51.0	+3 22.6	-0.3557	0.5116	0.2506	+25-60	
75 Piscium	6.3	+4.18	+27.5	+12 30.5	24	4 54.4	-7 57.2	-1.0346	0.5128	+0.2392	+13-77	
7 Piscium	3.7	4.19	26.8	14 54.9	17	37.1	+4 22.8	-0.6817	0.5155	0.2254	+7-70	
101 Piscium	6.2	4.19	26.8	14 14.1	19	48.1	+6 29.9	+0.5441	0.5160	0.2227	+76-10	
105 Piscium	6.1	4.20	26.5	15 58.9	21	45.6	+8 23.8	-0.9158	0.5166	0.2202	-7-74	
3 Arietis	6.4	4.21	26.1	16 59.7	5	14.2	+11 46.1	-1.2573	0.5176	0.2158	-35-71	
4 Arietis	5.8	+4.20	+26.1	+16 32.4	2	2.5	-11 27.1	-0.5906	0.5178	+0.2147	+12-70	
1 Arietis	5.1	4.21	25.7	17 24.6	6	38.0	-7 0.0	-0.5057	0.5191	0.2084	-13-67	
35 B. Arietis	6.4	4.21	25.4	17 51.1	9	48.2	-3 55.6	-0.3936	0.5201	0.2038	-21-59	
47 B. Arietis	6.5	4.20	25.3	17 37.9	11	49.4	-1 58.2	+0.2448	0.5207	0.2009	-58-41	
20 H. Arietis	6.4	4.20	25.3	16 50.0	12	37.6	-1 11.4	+1.2866	0.5210	0.1997	+85-45	
15 Arietis	5.9	+4.22	+24.0	+19 6.4	13	13.4	-0 36.7	-1.0724	0.5212	+0.1988	-19-71	
0 Arietis	5.6	4.22	24.5	19 30.9	16	56.0	+2 59.0	-0.7927	0.5224	0.1931	0-70	
26 Arietis	6.2	4.22	24.0	19 20.1	23	4.5	+8 56.1	+0.3953	0.5245	0.1831	+67-11	
ν Arietis	5.4	4.24	23.1	21 36.0	26	3 2.6	-11 13.3	-1.2065	0.5259	0.1764	-53-66	
μ Arietis	5.7	4.21	23.4	19 39.4	4	47.3	-9 31.8	+1.2280	0.5265	0.1734	+90-47	
ϵ Arietis (mean)	4.6	+4.21	+22.2	+21 0.4	12	54.0	-1 40.6	+1.0971	0.5294	+0.1587	+90-31	
64 Arietis	5.8	4.24	19.7	24 25.8	27	0 47.3	+9 49.7	-0.9134	0.5335	0.1357	-10-66	
7 Tauri	5.9	4.23	19.1	24 11.1	5	33.6	-9 33.4	-0.0211	0.5351	0.1259	+42-28	
11 Tauri	6.1	4.24	18.4	25 3.6	8	30.5	-6 42.3	-0.6241	0.5360	0.1197	+8-64	
16 Tauri	5.4	4.21	18.4	24 1.7	10	24.2	-4 52.3	+0.7383	0.5366	0.1157	+90-13	
17 Tauri	3.8	+4.20	+18.5	+23 51.1	10	26.4	-4 50.2	+0.9367	0.5366	+0.1157	+90-15	
18 Tauri	5.6	4.22	18.2	24 34.7	10	33.8	-4 43.1	+0.1491	0.5366	0.1154	+52-16	
9 Tauri	4.3	4.21	18.3	24 12.4	10	35.4	-4 41.5	+0.5626	0.5367	0.1153	+84-3	
20 Tauri	4.1	4.21	18.3	24 6.5	10	52.8	-4 24.6	+0.7047	0.5367	0.1147	+90-11	
21 Tauri	5.8	4.21	18.3	24 17.7	10	54.9	-4 22.6	+0.5024	0.5367	0.1146	+77 0	
22 Tauri	6.5	+4.21	+18.3	+24 16.1	10	58.8	-4 18.8	+0.5391	0.5368	+0.1145	+80-1	
23 Tauri	4.3	4.20	18.4	23 41.4	11	7.1	-4 10.8	+1.1941	0.5368	0.1142	+90-46	
7 Tauri	3.0	4.20	18.3	23 50.9	11	39.3	-3 39.7	+1.0800	0.5370	0.1131	+90-33	
27 Tauri	3.7	4.19	18.2	23 48.0	12	26.2	-2 54.4	+1.2217	0.5372	0.1114	+86-46	
28 Tauri	5.2	4.20	18.2	23 53.0	12	26.8	-2 53.8	+1.1306	0.5372	0.1114	+90-46	
14 H. Tauri	5.3	+4.23	+17.6	+25 19.7	12	56.9	-2 24.7	-0.4097	0.5374	+0.1103	+20-47	
ρ Tauri	5.6	4.20	15.8	26 15.9	22	25.0	+6 44.6	-0.4978	0.5400	0.0894	+15-51	
ϕ Tauri	5.0	4.21	14.7	27 9.1	28	2 46.2	+10 57.1	-1.1121	0.5411	0.0795	-27-43	
χ Tauri	5.3	4.16	15.2	25 26.0	3	49.1	+11 57.8	+0.8707	0.5413	0.0771	+90-15	
17 B. Aurigæ	6.0	4.14	11.0	27 45.6	17	31.0	+1 12.0	-0.8645	0.5440	0.0451	-8-62	
38 B. Aurigæ	6.5	+4.09	+10.0	+27 34.9	22	52.7	+6 22.7	-0.4598	0.5447	+0.0322	+17-44	
47 B. Aurigæ	6.0	4.08	10.4	27 55.6	21	10.9	+8 36.1	-0.7750	0.5449	0.0267	-2-62	
354 B. Tauri	6.4	4.04	9.4	27 52.5	6	15.2	-10 30.0	-0.6126	0.5453	+0.0144	+8-53	
107 B. Aurigæ	6.5	3.98	8.1	27 36.6	12	59.1	-4 0.0	-0.2772	0.5455	0.0019	+27-20	
112 B. Aurigæ	5.7	3.96	8.3	26 52.5	13	32.8	-3 27.4	+0.5354	0.5455	0.0033	+81-11	
406 B. Tauri	5.6	+3.93	+6.7	+27 56.7	19	45.0	+2 32.0	-0.7164	0.5454	-0.0183	-2-68	

ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

SEPTEMBER.

THE STAR'S					AT CONJUNCTION IN R. A.					Limiting Par- allels.		
Name.	Mag.	Red'ns from 1915.0.		Apparent Declina- tion.	Washington Mean Time.	Hour Angle, <i>H</i>	<i>y</i>	<i>x</i>	<i>y</i>	N. S.		
		$\Delta\alpha$	$\Delta\delta$									
		<i>s</i>	<i>"</i>	<i>'</i>	<i>d</i>	<i>h</i>	<i>m</i>	<i>h</i>	<i>m</i>	<i>'</i>	<i>"</i>	
Tauri	4.6	+3.91	+ 6.6	+27 35.7	29	20	49.2	+ 3 34.0	-0.3499	0.5454	-0.0209	+23 -36
B. Tauri	6.1	3.88	5.9	27 34.2	30	0	16.9	+ 6 54.7	-0.4097	0.5452	0.0293	+20 -41
Geminorum	3.2	+3.60	+ 2.9	+25 13.0		19	45.3	+ 1 43.2	+1.1611	0.5427	-0.0750	+90 +46

OCTOBER.

Geminorum	5.7	+3.55	+ 1.8	+25 29.0	1 0 56.5	+ 6 44.0	+0.4437	0.5416	-0.0876	+72 -0
Geminorum	6.2	3.55	1.3	26 11.6	2 31.6	+ 8 15.8	-0.4792	0.5413	0.0912	+16 -49
Geminorum	6.3	3.55	1.2	26 1.8	2 49.9	+ 8 33.5	-0.3276	0.5412	0.0918	+25 -41
Geminorum	5.8	3.43	0.7	24 16.3	8 49.1	+ 9 39.4	+1.0132	0.5398	0.1052	+90 +32
Geminorum	6.1	+3.45	+ 0.2	+25 2.0	9 50.6	+ 8 40.0	+0.0684	0.5396	-0.1075	+47 -21
Geminorum	5.1	3.40	0.6	25 12.9	13 53.9	+ 4 44.8	-0.5836	0.5386	0.1164	+11 -58
B. D.+23° 1744	6.4	3.29	0.6	23 4.2	18 16.6	+ 0 30.8	+1.2338	0.5374	0.1257	+85 +48
B. Geminorum	6.3	3.31	1.6	24 33.1	20 45.7	+ 1 53.3	-0.7051	0.5367	0.1310	+4 -65
B. Geminorum	6.0	3.30	1.7	24 24.9	21 12.7	+ 2 19.5	-0.6160	0.5366	0.1319	+ 9 -61
B. Geminorum	6.3	+3.25	+ 1.4	+23 13.0	22 3.7	+ 3 8.8	+0.5816	0.5363	-0.1337	+84 + 2
B. Geminorum	6.3	3.23	1.4	22 36.0	23 11.4	+ 4 14.2	+1.1012	0.5360	0.1360	+90 +35
Geminorum	3.7	3.27	2.2	24 36.1	23 39.7	+ 4 41.6	-1.1484	0.5359	0.1370	-29 -65
Geminorum	6.3	3.22	2.1	23 21.1	2 1 36.3	+ 6 34.4	-0.0538	0.5353	0.1410	+40 -31
MARS	1.1	...	...	21 38.2	8 32.6	+10 43.0	+0.7885	0.5090	0.1509	+90 +11
Canceri	6.2	+3.11	+ 3.4	+22 52.7	9 58.0	+ 9 20.4	-0.7854	0.5329	-0.1576	- 1 -67
Canceri	5.5	3.08	3.2	21 49.7	10 40.4	+ 8 39.3	+0.2438	0.5327	0.1589	+58 -18
B. Canceri	6.0	2.99	3.9	21 0.9	16 39.7	+ 2 51.7	+0.1396	0.5310	0.1702	+51 -24
Canceri	5.5	2.91	4.7	20 43.8	22 35.0	+ 2 52.2	-0.5808	0.5293	0.1809	+11 -65
Canceri	6.5	2.87	5.1	20 18.4	3 2 8.8	+ 6 19.2	-0.7884	0.5284	0.1871	0 -70
Canceri	6.5	+2.87	+ 5.1	+20 16.2	2 11.3	+ 6 21.6	-0.7569	0.5283	-0.1871	+ 2 -70
B. Canceri	6.5	2.86	5.0	19 58.2	2 16.6	+ 6 26.8	-0.4488	0.5283	0.1873	+19 -58
Canceri	6.3	2.86	5.0	19 50.7	2 19.1	+ 6 29.2	-0.3218	0.5283	0.1874	+26 -50
Canceri	4.2	2.80	5.1	18 28.0	4 22.7	+ 8 28.8	+0.7750	0.5278	0.1908	+90 + 7
B. Canceri	6.1	2.79	5.6	19 8.9	7 18.3	+11 18.8	-0.5258	0.5270	0.1957	+15 -63
Canceri (var.)	6.2	+2.73	+ 5.4	+17 33.2	9 34.2	+10 29.5	+0.7415	0.5264	-0.1993	+90 + 4
Canceri	5.6	2.59	6.2	15 17.6	19 17.0	+ 1 5.1	+1.1509	0.5242	0.2141	+90 +29
B. Canceri	6.4	2.57	6.7	15 43.8	22 14.1	+ 1 46.5	+0.0442	0.5236	0.2183	+46 -34
Leonis	6.2	2.48	7.4	14 45.4	4 5 27.0	+ 8 45.8	-0.5290	0.5224	0.2280	+15 -68
Leonis	6.5	2.47	7.6	14 43.8	6 30.5	+ 9 47.4	-0.7415	0.5222	0.2294	+ 4 -75
Leonis	5.6	+2.44	+ 7.8	+14 24.5	9 19.9	+11 28.5	-1.0520	0.5218	-0.2329	-16 -76
Leonis	5.8	2.39	7.4	12 12.0	10 40.3	+10 10.6	+0.9771	0.5216	0.2345	+90 +13
Leonis	6.4	2.38	7.4	11 57.6	11 11.5	+ 9 40.4	+1.1092	0.5216	0.2351	+90 +23
Leonis (var.)	5-10	2.38	7.4	11 49.3	11 15.2	+ 9 36.8	+1.2410	0.5216	0.2352	+90 +34
Leonis	5.0	2.35	8.3	12 50.9	16 32.1	+ 4 29.7	+1.1039	0.5210	0.2412	+19 -77
Leonis	4.6	+2.26	+ 8.3	+10 24.7	21 22.4	+ 0 11.7	+0.2870	0.5207	-0.2463	+59 -26
Leonis	5.9	2.18	9.0	9 12.9	5 6 0.9	+ 8 34.3	-0.6188	0.5206	0.2543	+11 -78
Leonis	5.2	2.12	9.1	7 23.3	10 47.1	+10 48.3	+0.0606	0.5208	0.2582	+47 -38
Sextantis	6.1	2.06	9.2	5 11.5	15 2.7	+ 6 40.6	+1.2543	0.5211	0.2613	+90 +31
Sextantis	6.3	2.08	9.7	6 49.1	16 24.2	+ 5 21.6	-0.7963	0.5212	0.2622	+ 2 -83
Leonis	5.0	+2.00	+ 9.9	+ 4 4.3	23 35.7	+ 1 36.6	+0.1589	0.5222	-0.2664	+52 -34
Leonis	5.7	1.95	10.0	+ 2 24.9	2 45.5	+ 4 40.5	+1.0292	0.5228	0.2678	+90 +12
NEW MOON.										
G. Libræ	6.4	+2.01	+15.1	+20 49.2	10 5 46.6	+ 4 19.1	-0.1777	0.5800	-0.1863	+22 -53
G. Libræ	6.1	+2.02	+15.0	+20 58.3	6 11.5	+ 4 43.0	-0.1026	0.5803	-0.1854	+26 -49
B. Libræ	5.7	2.12	16.3	21 2.3	10 13.6	+ 8 35.7	-0.7669	0.5833	0.1760	-10 -90
G. Libræ	6.1	2.12	15.0	21 42.4	13 48.1	+11 58.3	-0.7141	0.5858	0.1673	- 8 -90
G. Libræ	5.8	2.16	14.8	22 5.4	17 41.0	+ 8 14.7	-0.6615	0.5884	0.1574	-23 -90
B. Libræ	6.3	2.26	14.9	24 12.3	11 0 8.2	+ 2 3.2	+0.1885	0.5924	0.1401	-36 -33
Libræ	5.0	+2.30	+14.6	+23 32.8	2 52.4	+ 0 34.3	-0.8421	0.5940	-0.1325	-19 -9

[Eph 15]

ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

OCTOBER.

THE STAR'S					AT CONJUNCTION IN R. A.						Limiting Par- allels.	
Name.	Mag.	Red'n's from 1915.0.		Apparent Declina- tion.	Washington Mean Time.	Hour Angle, H	Y	α'	γ'	N.	S.	
		$\Delta\alpha$	$\Delta\delta$		d h m	h m						
b Scorpii	4.7	+2.37	-14.8	25 29.9	11 6 54.9	+4 26.9	+0.5924	0.5962	-0.1209	+58	-10	
A Scorpii	4.6	2.39	14.6	25 4.7	7 55.0	+5 24.6	+0.0538	0.5966	0.1180	+27	-40	
31 B. Scorpii	5.4	2.38	14.4	24 17.1	8 2.1	+5 31.3	-0.7519	0.5967	0.1177	-15	-90	
3 Scorpii	5.9	2.39	14.5	24 59.8	8 18.8	+5 47.4	-0.0742	0.5968	0.1169	+20	-47	
4 Scorpii	5.7	2.41	14.7	26 1.2	8 37.2	+6 5.0	+0.9118	0.5970	0.1160	+64	+10	
40 B. Scorpii	5.4	+2.41	-14.3	24 35.4	9 48.0	+7 12.0	-0.6495	0.5975	-0.1125	-10	-90	
π Scorpii	3.0	2.43	14.6	25 52.5	9 53.1	+7 17.8	+0.6220	0.5976	0.1122	+60	-8	
48 B. Scorpii	4.9	2.45	14.4	25 38.0	11 34.9	+8 55.4	+0.1952	0.5983	0.1071	+34	-32	
50 B. Scorpii	6.4	2.44	14.1	24 29.8	11 48.5	+9 8.4	-0.9636	0.5984	0.1065	-29	-90	
65 B. Scorpii	5.5	2.49	14.3	26 6.2	13 21.9	+10 37.9	+0.4785	0.5991	0.1018	+50	-16	
85 B. Scorpii	6.0	+2.52	-13.8	25 15.9	15 54.8	-10 55.6	-0.6075	0.6001	-0.0940	-9	-88	
σ Scorpii	3.1	2.56	13.7	25 23.6	18 15.7	-8 40.6	-0.6922	0.6008	0.0867	-15	-90	
α Scorpii	1.2	2.62	13.6	26 14.9	21 18.5	-5 45.4	-0.0883	0.6017	0.0772	+16	-48	
116 B. Scorpii	6.2	2.63	13.5	26 21.4	22 2.4	-5 3.4	-0.0349	0.6020	0.0749	+19	-45	
134 B. Scorpii	6.4	2.73	13.2	27 18.1	12 2 48.7	-0 29.1	+0.5881	0.6029	0.0597	+54	-10	
118 B. Ophiuchi	6.2	+2.86	-11.7	26 24.1	11 10.2	+7 31.1	-0.6977	0.6037	-0.0326	-10	-90	
95 G. Ophiuchi	6.1	2.92	11.8	27 39.7	13 11.6	+9 27.5	+0.5045	0.6037	0.0260	+46	-13	
36 Ophi. (1st star)	5.4	2.89	12.1	26 29.0	14 18.6	+10 31.5	-0.7040	0.6037	0.0223	-21	-90	
43 Ophiuchi	5.4	3.01	11.3	28 3.9	17 13.6	-10 40.9	+0.8316	0.6034	0.0128	+62	-6	
151 G. Ophiuchi	6.0	3.02	10.1	26 12.5	20 21.1	-7 41.3	-1.0559	0.6030	-0.0266	-44	-90	
163 G. Ophiuchi	6.3	+3.13	-9.9	27 50.8	13 0 36.4	-3 36.8	+0.6084	0.6021	+0.0112	+52	-8	
χ Sagittarii (var.)	4.4	3.16	9.6	27 48.1	2 11.5	-2 5.7	+0.5856	0.6017	0.0164	+51	-10	
4 G. Sagittarii	6.2	3.15	9.2	26 56.9	2 32.4	-1 45.7	-0.2671	0.6016	0.0175	+2	-60	
10 G. Sagittarii	5.7	3.23	9.0	28 3.3	5 35.2	+1 9.4	+0.9144	0.6006	0.0273	+62	+12	
66 B. Sagittarii	4.7	3.34	7.0	27 4.6	13 36.4	+8 50.5	+0.2503	0.5972	0.0526	+32	-29	
67 B. Sagittarii	6.4	+3.31	-6.6	25 38.4	13 52.2	+9 5.7	-1.1852	0.5971	+0.0534	-51	-89	
68 G. Sagittarii	6.2	3.40	6.2	26 41.3	17 16.3	-11 38.7	+0.0720	0.5954	0.0638	+24	-39	
λ Sagittarii	2.9	3.36	5.9	25 28.3	17 23.0	-11 32.2	-1.1493	0.5954	0.0642	-47	-90	
69 G. Sagittarii	6.3	3.40	6.2	26 48.6	17 24.8	-11 30.5	+0.2052	0.5953	0.0643	+31	-31	
86 B. Sagittarii	6.5	3.40	6.1	26 38.3	17 44.2	-11 11.9	+0.0523	0.5952	0.0653	+23	-40	
126 B. Sagittarii	5.7	+3.46	-4.2	25 5.9	23 49.4	-5 21.7	-1.0528	0.5916	+0.0835	-37	-90	
ϕ Sagittarii	3.3	3.52	4.8	27 4.8	14 0 6.6	-5 5.2	+0.9774	0.5914	0.0843	+63	+16	
σ Sagittarii	2.1	3.56	3.8	26 24.3	3 49.9	+1 30.9	+0.6276	0.5890	0.0951	+59	-8	
162 B. Sagittarii	6.4	3.54	3.0	24 59.5	5 2.9	-0 20.9	-0.6865	0.5881	0.0985	-13	-90	
127 G. Sagittarii	6.4	3.56	2.8	25 3.7	5 51.1	+0 25.4	-0.5356	0.5876	0.1008	-5	-80	
172 B. Sagittarii	5.8	+3.56	-2.8	24 57.9	6 39.3	+1 11.7	-0.5515	0.5870	+0.1030	-5	-81	
189 B. Sagittarii	6.1	3.60	2.0	24 47.5	8 55.2	+3 22.2	-0.4882	0.5854	0.1093	-1	-6	
201 B. Sagittarii	5.9	3.66	2.1	26 3.1	10 51.8	+5 14.1	+1.0085	0.5839	0.1146	+64	+18	
ψ Sagittarii	4.9	3.66	1.6	25 24.3	11 47.0	+6 7.2	+0.4589	0.5832	0.1171	+50	-18	
208 B. Sagittarii	6.1	3.63	1.3	24 19.5	11 48.1	+6 8.2	-0.6359	0.5832	0.1171	-8	-90	
χ Sagittarii	4.9	+3.69	-0.5	24 40.5	15 39.9	+9 50.9	+0.1912	0.5802	+0.1273	+36	-32	
49 Sagittarii	5.5	3.67	-0.3	24 7.8	15 45.8	+9 56.6	-0.3508	0.5802	0.1275	+8	-65	
51 Sagittarii	5.8	3.76	+0.4	24 54.3	19 59.2	+9 59.8	+1.0013	0.5768	0.1382	+65	+16	
h Sagittarii	4.7	3.77	0.4	25 4.3	20 15.3	-9 44.4	+1.2082	0.5766	0.1389	+65	+36	
53 Sagittarii	6.3	3.74	1.2	23 37.3	21 32.6	-8 30.0	-0.0894	0.5755	0.1420	+22	-48	
274 B. Sagittarii	6.1	+3.74	+1.2	23 37.4	21 39.8	-8 23.1	-0.0699	0.5754	+0.1423	+23	-47	
329 B. Sagittarii	6.1	3.84	3.5	22 58.2	15 6 26.0	+0 3.3	+0.6025	0.5680	0.1627	+63	-10	
336 B. Sagittarii	6.5	3.84	3.8	22 50.0	7 24.9	+0 59.9	+0.6231	0.5672	0.1648	+64	-9	
4 Capricorni	5.7	3.90	5.4	22 4.3	13 27.3	+6 49.0	+0.8787	0.5620	0.1775	+68	+7	
ν Capricorni	5.3	3.89	8.8	18 26.2	23 1.9	-7 57.0	-1.0693	0.5538	0.1957	-26	-90	
81 B. Capricorni	6.4	+3.94	+9.7	-18 20.8	18 3 8.2	-3 59.4	-0.3438	0.5504	+0.2027	+17	-64	
19 Capricorni	5.7	3.95	10.2	18 14.6	5 34.5	-1 38.2	-0.0475	0.5484	0.2067	+37	-41	
21 Capricorni	6.5	3.97	10.9	17 51.6	8 18.4	+1 0.2	+0.2224	0.5462	0.2110	+47	-31	
URANUS	6.0	...	...	17 55.9	8 59.6	+1 39.9	+0.4417	0.5459	0.2121	+59	-10
θ Capricorni	4.2	3.99	11.4	17 34.1	10 36.5	+3 13.5	+0.4109	0.5444	0.2144	+58	-21	
29 Capricorni	5.5	+3.98	+13.0	-15 31.3	15 7.1	+7 35.0	-0.7261	0.5409	+0.2287	-1	-90	

[Eph 15]

ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

OCTOBER.

THE STAR'S					AT CONJUNCTION IN R. A.					Limiting Par- allels.	
	Mag.	Red'n's from 1915.0.		Apparent Declina- tion.	Washington Mean Time.	Hour Angle, H	Y	x'	y'	N.	S.
		$\Delta\alpha$	$\Delta\delta$								
		s	"	° ' "	d h m	h m				° ' "	
ii	5.1	+4.04	+15.4	14 25.4	17 3 13.5	-4 42.5	+0.8983	0.5321	+0.2355	+76	+6
ii	5.5	4.00	16.0	11 45.2	5 37.5	-2 23.1	-1.3136	0.5305	0.2379	-42	-85
ii	6.1	4.05	16.8	13 6.9	7 7.5	-0 56.0	+0.4630	0.5296	0.2394	+65	-19
	6.0	4.06	20.0	9 27.5	20 26.5	+11 57.9	-0.0915	0.5218	0.2505	+36	-48
	5.3	4.05	20.6	8 14.6	22 5.8	-10 25.9	-0.9506	0.5209	0.2515	-9	-90
	6.0	+4.05	+21.0	7 37.1	23 45.9	-8 48.8	-1.1854	0.5201	+0.2526	-26	-90
	6.1	4.07	21.6	6 59.0	18 3 39.2	-5 2.7	-0.8674	0.5182	0.2548	-4	-90
	6.4	4.12	22.3	7 24.1	9 41.2	+0 48.3	+1.1196	0.5157	0.2576	+83	+19
	5.8	4.12	23.6	5 26.1	15 47.5	+6 43.7	+0.6267	0.5134	0.2598	+82	-11
	6.3	4.12	23.7	5 15.5	16 52.5	+7 46.7	+0.7224	0.5131	0.2601	+85	-6
	6.1	+4.14	+24.0	5 9.7	19 3.3	+9 53.6	+1.1892	0.5124	+0.2606	+85	+25
	6.4	4.13	26.3	0 10.1	19 6 27.9	-3 1.8	-1.1163	0.5096	0.2619	-18	-90
	5.7	4.15	27.2	1 38.3	13 11.2	+3 29.7	-1.2785	0.5085	0.2616	-33	-88
	4.6	4.18	27.1	1 19.2	16 9.0	+6 22.3	-0.1661	0.5082	0.2612	+34	-52
	5.4	4.17	27.7	3 1.4	18 25.4	+8 34.7	-1.3883	0.5080	0.2607	-47	-78
	5.8	+4.20	+27.8	2 27.9	21 20.6	+11 24.8	-0.0342	0.5077	+0.2600	+41	-45
	6.2	4.21	27.7	1 37.5	21 55.7	+11 58.9	+1.0142	0.5077	0.2599	+90	+11
	5.6	4.30	29.2	6 29.7	20 18 33.6	+8 0.9	+1.0844	0.5086	0.2505	+90	+18
	6.5	4.31	29.5	8 54.0	23 9.9	-11 30.9	-0.3569	0.5092	0.2474	+25	-61
	6.3	4.40	29.7	12 30.5	21 12 19.4	+1 15.4	-1.0687	0.5119	0.2365	-17	-78
	3.7	+4.48	+29.2	+14 55.0	22 1 6.2	-10 20.4	-0.7422	0.5155	+0.2231	+4	-75
	6.2	4.49	29.1	14 14.1	3 17.6	-8 13.0	+0.4833	0.5161	0.2205	+73	-13
	6.1	4.52	29.0	15 59.0	5 15.5	-6 18.6	-0.9800	0.5168	0.2181	-12	-74
	6.4	4.54	28.8	16 59.7	8 44.8	-2 55.6	-1.3360	0.5180	0.2137	-46	-73
	5.8	4.55	28.7	16 32.4	9 33.3	-2 8.5	-0.6688	0.5182	0.2127	+7	-73
	5.1	+4.58	+28.4	+17 24.6	14 9.3	+2 19.0	-0.6533	0.5199	+0.2065	+8	-72
	6.4	4.60	28.1	17 51.2	17 19.9	+5 23.8	-0.4874	0.5210	0.2020	+17	-62
	6.5	4.60	27.9	17 38.0	19 21.2	+7 21.4	+0.1586	0.5218	0.1991	+52	-27
	6.4	4.60	27.8	16 50.0	20 9.5	+8 8.2	+1.1913	0.5221	0.1979	+90	+35
	5.9	4.63	27.7	19 6.4	20 45.3	+8 42.9	-1.1749	0.5223	0.1971	-28	-71
	5.6	+4.65	+27.4	+19 31.0	23 0 28.0	-11 41.3	-0.9017	0.5237	+0.1914	-7	-70
	6.2	4.68	26.6	19 29.2	6 36.6	-5 44.1	+0.2767	0.5261	0.1816	+59	-18
	5.4	4.73	26.0	21 36.1	10 34.5	-1 53.8	-1.3358	0.5276	0.1749	-56	-68
	5.7	4.70	26.0	19 39.4	12 19.2	-0 12.3	+1.0999	0.5283	0.1720	+90	+30
mean)	4.6	4.75	24.7	21 0.5	20 25.3	+7 38.4	+0.9536	0.5314	0.1575	+90	+22
	5.8	+4.87	+22.4	+24 25.8	24 8 17.4	-4 52.5	-1.0802	0.5358	+0.1345	-23	-66
	6.1	4.82	22.3	22 31.1	10 15.7	-2 58.1	+1.2897	0.5365	0.1305	+75	+56
	5.9	4.87	21.6	24 11.2	13 3.1	-0 16.2	-0.1946	0.5374	0.1247	+32	-36
	6.1	4.90	20.9	25 3.7	15 59.6	+2 34.5	-0.8030	0.5384	0.1186	-3	-65
	5.4	4.87	20.7	24 1.7	17 53.1	+4 24.3	+0.5580	0.5390	0.1146	+82	+3
	3.8	+4.87	+20.7	+23 51.2	17 55.3	+4 26.4	+0.7565	0.5390	+0.1145	+90	+14
	5.6	4.89	20.6	24 34.8	18 2.6	+4 33.5	-0.0320	0.5391	0.1142	+41	-27
	4.3	4.88	20.7	24 12.4	18 4.2	+4 35.1	+0.3819	0.5391	0.1142	+67	-6
	4.1	4.87	20.6	24 6.5	18 21.6	+4 51.9	+0.5238	0.5392	0.1135	+79	+1
	5.8	4.88	20.6	24 17.7	18 23.7	+4 53.9	+0.3211	0.5392	0.1135	+63	-9
	6.5	+4.88	+20.6	+24 16.2	18 27.6	+4 57.6	+0.3578	0.5392	+0.1133	+65	-7
	4.3	4.86	20.6	23 41.4	18 35.9	+5 5.7	+1.0133	0.5392	0.1130	+90	+31
	3.0	4.87	20.5	23 50.9	19 8.0	+5 36.7	+0.8082	0.5394	0.1119	+90	+23
	3.7	4.87	20.4	23 48.0	19 54.8	+6 22.0	+1.0389	0.5396	0.1102	+90	+33
	5.2	4.87	20.4	23 53.0	19 55.4	+6 22.6	+0.9477	0.5396	0.1102	+90	+27
	5.3	+4.91	+20.0	+25 19.8	20 25.4	+6 51.6	-0.5952	0.5398	+0.1091	+10	-58
	5.6	4.94	17.9	26 15.9	25 52.6	-8 0.1	-0.6973	0.5423	0.0883	+3	-63
	5.3	4.91	16.9	25 26.1	11 16.2	-2 47.4	+0.6654	0.5435	0.0760	+90	+13
	6.0	4.96	13.3	27 45.6	26 57.9	+10 26.5	-1.0901	0.5457	0.0439	-26	-62
	6.5	4.94	12.0	27 34.9	6 19.8	-8 22.6	-0.6912	0.5461	0.0311	+3	-60
	6.0	+4.94	+11.5	+27 55.6	8 38.2	-6 8.0	-1.0097	0.5462	+0.0256	-19	-62

ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

OCTOBER.

THE STAR'S					AT CONJUNCTION IN R. A.				
Name.	Mag.	Red'ns from 1915.0.		Apparent Declination.	Washington Mean Time.	Hour Angle, H	Y	x'	y'
		$\Delta\alpha$	$\Delta\delta$						
		s	"	"	d h m	h m			
354 B. Tauri	6.4	+4.91	+10.2	+27 52.5	26 13 43.1	-1 14.3	-0.8528	0.5464	+0.0134
107 B. Aurigæ	6.5	4.87	8.6	27 36.6	20 28.3	+5 17.0	-0.5237	0.5462	-0.0029
112 B. Aurigæ	5.7	4.84	8.7	26 52.5	21 2.1	+5 49.7	-0.2905	0.5461	0.0043
406 B. Tauri	5.6	4.84	6.9	27 56.7	27 3 15.9	+11 50.6	-0.9712	0.5456	0.0193
136 Tauri	4.6	4.82	6.6	27 35.7	4 20.4	-11 7.1	-0.6045	0.5457	0.0219
139 Tauri	4.7	+4.74	+6.6	+25 56.8	6 29.1	-9 2.7	+1.1722	0.5452	-0.0270
415 B. Tauri	6.1	4.79	5.8	27 34.2	7 49.3	-7 45.2	-0.6678	0.5450	0.0302
8 Geminorum	3.2	4.53	1.6	25 13.0	28 3 27.2	+11 12.8	+0.8948	0.5409	0.0759
37 Geminorum	5.7	4.48	+0.3	25 29.0	8 41.9	-7 43.1	+0.1707	0.5394	0.0876
39 Geminorum	6.2	4.49	-0.3	26 11.6	10 18.1	-6 10.0	-0.7582	0.5389	0.0912
40 Geminorum	6.3	4.49	-0.4	26 1.8	10 36.6	-5 52.2	-0.6059	0.5388	-0.0919
69 Geminorum	5.2	4.41	0.1	24 20.3	12 0.4	-4 31.1	+1.1343	0.5384	0.0949
48 Geminorum	5.8	4.36	1.2	24 16.3	16 40.4	-0 0.4	+0.7397	0.5370	0.1051
52 Geminorum	6.1	4.38	1.8	25 2.0	17 42.7	+0 59.8	-0.2114	0.5366	0.1073
A Geminorum	5.1	4.33	2.7	25 12.8	21 49.4	+4 58.4	-0.8694	0.5353	0.1160
B. D.+23° 1744	6.4	4.21	-3.0	+23 4.1	29 2 16.1	+9 16.5	+0.9586	0.5338	-0.1351
176 B. Geminorum	6.3	4.23	4.1	24 33.0	4 47.6	+11 43.0	-0.9944	0.5329	0.1302
181 B. Geminorum	6.0	4.22	4.1	24 24.9	5 15.0	-11 50.4	-0.9049	0.5327	0.1311
187 B. Geminorum	6.3	4.17	3.9	23 12.9	6 6.8	-11 0.4	+0.3008	0.5324	0.1324
192 B. Geminorum	6.3	4.13	3.9	22 36.0	7 15.6	-9 53.8	+0.8239	0.5320	0.1351
82 Geminorum	6.3	+4.13	-4.7	+23 21.1	9 43.0	-7 31.1	-0.3399	0.5311	-0.1399
9 Cancri	6.2	4.01	6.4	22 52.6	18 13.8	+0 43.3	-1.0786	0.5282	0.1501
μ Cancri	5.5	3.97	6.2	21 49.6	18 56.9	+1 25.0	-0.0413	0.5280	0.1574
49 B. Cancri	6.0	3.87	7.2	21 0.9	1 3.3	+7 19.7	-0.1464	0.5259	0.1683
79 Cancri	5.5	3.78	8.2	20 43.7	7 5.7	-10 49.3	-0.8812	0.5238	0.1786
39 Cancri	6.5	+3.73	-8.8	+20 18.4	10 44.1	-7 17.7	-1.0808	0.5227	-0.1846
40 Cancri	6.5	3.73	8.8	20 16.2	10 46.6	-7 15.3	-1.0490	0.5227	0.1847
102 B. Cancri	6.5	3.71	8.7	19 58.1	10 52.0	-7 10.1	-0.7381	0.5226	0.1848
8 Cancri	6.3	3.71	8.6	19 50.6	10 54.6	-7 7.5	-0.6100	0.5226	0.1849
8 Cancri	4.2	3.65	8.7	18 27.9	13 0.9	-5 5.2	+0.4969	0.5220	0.1883
139 B. Cancri	6.1	+3.63	-9.3	+19 8.9	16 0.2	-2 11.5	-0.8142	0.5211	-0.1930
X Cancri (var.)	6.2	3.56	9.2	17 33.2	18 19.1	+0 3.1	+0.4653	0.5204	0.1905
81 Cancri	6.4	3.38	9.6	15 20.2	2 48.0	+8 16.5	+1.1407	0.5182	0.2088
π Cancri	5.6	3.38	10.1	15 17.5	4 15.0	+9 40.8	+0.8841	0.5179	0.2108
227 B. Cancri	6.4	3.36	10.7	15 43.8	7 16.1	-11 23.6	-0.2307	0.5173	0.2149
7 Leonis	6.2	+3.25	-11.5	+14 45.4	14 38.9	-4 14.3	-0.8030	0.5150	-0.2242
11 Leonis	6.5	3.24	11.7	14 43.7	15 43.9	-3 11.2	-1.0164	0.5158	0.2255
ψ Leonis	5.6	3.20	12.0	14 24.5	18 37.2	-0 23.2	-1.3270	0.5154	0.2289
18 Leonis	5.8	3.14	11.4	12 11.9	19 59.3	+0 56.4	+0.7221	0.5152	0.2305
19 Leonis	6.4	3.12	11.4	11 57.5	20 31.2	+1 27.4	+0.8500	0.5152	0.2311
R Leonis (var.)	5-10	+3.12	-11.4	+11 49.2	20 35.0	+1 31.1	+0.9890	0.5151	-0.2312

NOVEMBER.

ν Leonis	5.0	+3.08	-12.5	+12 50.8	1 1 59.1	+6 45.3	-1.3709	0.5147	-0.2370
A Leonis	4.6	+2.97	-12.4	+10 24.7	6 55.8	+11 33.1	+0.0388	0.5144	-0.2420
44 Leonis	5.9	2.87	13.1	9 12.8	15 45.4	-3 53.2	-0.8617	0.5146	0.2498
48 Leonis	5.2	2.78	13.0	7 23.3	20 37.4	+0 50.0	-0.1599	0.5150	0.2537
35 Sextantis	6.1	2.72	12.9	5 11.4	2 0 58.0	+5 2.8	+1.0412	0.5154	0.2567
37 Sextantis	6.3	2.72	13.6	6 49.1	2 21.0	+6 23.3	-1.0222	0.5157	0.2570
d Leonis	5.0	+2.62	-13.5	+4 4.2	9 40.2	-10 30.8	-0.0459	0.5170	-0.2618
β^4 Leonis	5.7	2.54	13.4	2 24.8	12 53.1	-7 23.8	+0.8365	0.5179	0.2633
75 Leonis	5.4	2.52	14.0	2 28.5	18 4.0	-2 22.4	-0.5971	0.5194	0.2654
76 Leonis	6.0	2.51	13.9	2 6.8	18 53.1	-1 34.8	-0.4387	0.5196	0.2657
359 B. Leonis	6.3	2.48	13.6	0 35.7	21 4.4	+0 32.5	+0.5526	0.5204	0.2663
79 Leonis	5.5	+2.49	-14.0	+1 52.2	21 26.2	+0 53.6	-0.8656	0.5205	-0.2668

(Opp 13)

ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

NOVEMBER.

THE STAR'S					AT CONJUNCTION IN R. A.					Limiting Parallels.	
Name.	Mag.	Red'n's from 1915.0.		Apparent Declination.	Washington Mean Time.	Hour Angle, <i>H</i>	<i>Y</i>	<i>x'</i>	<i>y'</i>	<i>N.</i>	<i>S.</i>
		$\Delta\alpha$	$\Delta\delta$								
		<i>s</i>	<i>"</i>	<i>°</i> <i>'</i>	<i>d</i> <i>h</i> <i>m</i>	<i>h</i> <i>m</i>				<i>°</i>	<i>'</i>
Leonis	4.5	+2.41	-14.0	0 21.5	3 35.0	+7 5.5	-0.2689	0.5230	-0.2678	+20	-58
B. Leonis	6.2	2.39	13.6	1 58.2	4 33.2	+7 47.3	+1.1995	0.5233	0.2679	+88	+26
B. Virginis	6.5	2.24	14.1	5 15.0	21 55.8	+0 37.0	-0.1003	0.5323	0.2668	+37	-48
Virginis	5.3	2.17	14.1	8 59.2	4 7 7.0	+9 30.2	+1.2570	0.5384	0.2632	+81	+32
Virginis	4.8	2.16	14.5	7 31.9	9 39.4	+11 57.5	-0.8833	0.5402	0.2619	-5	-90
NEW MOON.											
B. Ophiuchi	6.2	+2.63	-10.4	-26 24.1	8 19 29.6	-6 21.7	-0.5059	0.6152	-0.0313	-9	-78
G. Ophiuchi	6.1	2.68	10.3	27 39.6	21 27.0	-4 29.4	+0.6808	0.6152	0.0246	+59	-4
Ophi. (1st star)	5.4	2.64	10.9	26 28.9	22 31.8	-3 27.5	-0.5063	0.6151	0.0209	-10	-78
Ophiuchi	5.4	+2.74	-9.8	-28 3.9	9 1 21.0	-0 45.7	+1.0098	0.6149	-0.0113	+62	+19
G. Ophiuchi	6.3	2.72	9.2	25 52.3	2 39.4	+0 29.3	-1.1668	0.6147	0.0068	-53	-90
G. Ophiuchi	6.0	2.75	9.0	20 12.5	4 22.5	+2 7.9	-0.8417	0.6144	-0.0009	-30	-90
G. Ophiuchi	6.3	2.83	8.6	27 50.8	8 29.4	+6 4.0	+0.8029	0.6135	+0.0131	+62	+4
Sagittarii (var.)	4.4	2.85	8.4	27 48.1	10 1.4	+7 31.9	-0.7831	0.6130	0.0183	+62	+3
G. Sagittarii	6.2	+2.84	-8.2	-26 56.9	10 21.6	+7 51.3	-0.0552	0.6129	+0.0194	+13	-46
G. Sagittarii	5.7	2.91	7.8	28 3.3	13 18.4	+10 40.4	+1.1124	0.6118	0.0293	+62	+29
B. Sagittarii	4.7	2.99	6.2	27 4.5	21 4.3	-5 53.8	+0.4710	0.6081	0.0549	+40	-16
B. Sagittarii	6.4	2.96	5.9	25 38.4	21 19.6	-5 39.2	-0.9407	0.6080	0.0557	-32	-90
G. Sagittarii	6.2	3.03	5.5	26 41.3	10 37.4	-2 29.9	+0.3016	0.6060	0.0663	+36	-26
Sagittarii	2.9	+3.00	-5.3	-25 28.3	0 43.9	-2 23.7	-0.9004	0.6059	+0.0666	-29	-90
G. Sagittarii	6.3	3.04	5.5	26 48.6	0 45.6	-2 22.1	+0.4329	0.6059	0.0667	+44	-18
B. Sagittarii	6.5	3.03	5.4	26 38.3	1 4.4	-2 4.0	+0.2829	0.6057	0.0677	+36	-27
B. Sagittarii	5.7	3.08	3.8	25 5.9	6 58.5	+3 35.0	-0.7966	0.6017	0.0860	-20	-90
Sagittarii	3.3	3.14	4.3	27 4.8	7 15.1	+3 51.0	+1.2029	0.6015	0.0869	+63	+38
Sagittarii	2.1	+3.17	-3.4	-26 24.3	10 51.0	+7 18.8	-0.8637	0.5987	+0.0977	+64	+8
B. Sagittarii	6.4	3.15	2.8	24 59.5	12 2.8	+8 26.7	-0.4292	0.5978	0.1012	+1	-71
G. Sagittarii	6.4	3.16	2.6	25 3.7	12 49.6	+9 11.5	-0.2704	0.5972	0.1034	+9	-60
B. Sagittarii	5.8	3.17	2.6	24 57.9	13 36.5	+9 56.5	-0.2941	0.5965	0.1057	+9	-61
B. Sagittarii	6.1	3.20	1.9	24 47.5	15 48.5	-11 56.9	-0.2290	0.5947	0.1120	+12	-57
B. Sagittarii	5.9	+3.25	-1.9	-26 3.0	17 41.8	-10 8.2	+1.2485	0.5931	+0.1173	+64	+44
Sagittarii	4.9	3.25	1.6	25 24.3	18 35.6	+9 16.6	-0.7080	0.5923	0.1197	+64	-3
B. Sagittarii	6.1	3.22	1.3	24 19.5	18 36.7	+9 15.5	-0.3712	0.5922	0.1198	+6	-66
Sagittarii	4.9	3.28	0.6	24 40.5	22 22.2	-5 39.2	+0.4487	0.5888	0.1299	+50	-18
Sagittarii	5.5	3.26	0.3	24 7.8	22 28.0	-5 33.6	-0.0857	0.5888	0.1302	+21	-48
Sagittarii	5.8	+3.34	+0.3	-24 54.4	11 2 34.8	-1 36.7	+1.2528	0.5849	+0.1408	+65	+43
Sagittarii	6.3	3.32	1.0	23 37.3	4 5.9	-0 9.2	+0.1784	0.5834	0.1446	+37	-33
B. Sagittarii	6.1	3.32	1.0	23 37.5	4 12.0	-0 2.5	+0.1978	0.5834	0.1449	+38	-32
B. Sagittarii	6.1	3.41	3.0	22 58.3	12 46.8	+8 11.5	-0.8703	0.5750	0.1651	+67	+7
B. Sagittarii	6.5	3.42	3.3	22 50.0	13 44.4	+9 6.9	-0.8916	0.5740	0.1672	+67	+8
Capricorni	5.7	+3.47	+4.6	-22 4.3	19 39.2	-9 11.7	+1.1496	0.5681	+0.1797	+68	+28
Capricorni	5.6	3.44	6.7	18 51.8	12 0 41.9	-4 20.1	-1.1779	0.5630	0.1895	-36	-90
Capricorni	5.3	3.48	7.8	18 26.2	5 3.3	-0 8.2	-0.7723	0.5588	0.1974	-7	-90
B. Capricorni	6.4	3.52	8.6	18 20.9	9 5.6	+3 45.5	-0.0522	0.5548	0.2042	+32	-46
Capricorni	5.7	3.54	9.1	18 14.6	11 29.7	+6 4.5	+0.3305	0.5525	0.2081	+53	-25
B. Capricorni	5.7	+3.52	+10.0	-16 21.4	12 47.2	+7 19.3	-1.3254	0.5512	+0.2101	-50	-79
Capricorni	6.5	3.57	9.7	17 51.6	14 11.3	+8 40.5	-0.5108	0.5500	0.2122	+63	-16
URANUS	6.0	...	...	17 52.0	15 11.7	+9 38.8	-0.7316	0.5483	0.2135	+72	-3
Capricorni	4.2	3.59	10.2	17 34.1	16 27.6	+10 52.1	-0.6083	0.5478	0.2155	+72	-5
Capricorni	5.5	3.58	11.8	15 31.3	20 55.0	-8 49.7	-0.4295	0.5438	0.2216	+15	-69
Capricorni	5.1	+3.67	+14.0	-14 25.4	13 8 54.7	+2 46.1	+1.1839	0.5337	+0.2354	+76	+26
Capricorni	5.5	3.64	15.5	11 45.2	11 17.7	+5 4.5	-1.0173	0.5318	0.2378	-16	-90
B. Capricorni	6.1	3.68	15.3	13 6.9	12 47.3	+6 31.1	-0.7501	0.5307	0.2392	+77	-3
B. Aquarii	6.5	3.65	16.4	10 42.5	14 41.1	+8 21.3	-1.2939	0.5293	0.2409	+39	-89
Aquarii	4.3	3.71	19.0	8 12.1	14 2 2.1	-4 39.1	-1.1282	0.5216	0.2493	-22	-99
Aquarii	6.0	+3.73	+18.5	-9 27.5	2 3.3	-38.0	+0.1906	0.5216	+0.2493	+51	-33

ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

NOVEMBER.

THE STAR'S					AT CONJUNCTION IN R. A.							Limiting Parallax.
Name.	Mag.	Red'n's from 1915.0.		Apparent Declination.	Washington Mean Time.			Hour Angle, H	Y	Z	γ	N. S.
		Δα	Δδ		d	h	m	h	m			
ρ Aquarii	5.3	+3.73	+19.2	8 14.6	14	3	42.5	3 1.8	-0.6676	0.5206	+0.2503	6.8
170 B. Aquarii	6.0	3.73	19.7	7 37.1		5	22.5	1 24.8	-0.9035	0.5196	0.2512	6.8
186 B. Aquarii	6.1	3.76	20.3	6 59.0		9	15.7	+2 21.2	-0.5902	0.5174	0.2532	11.8
67 Aquarii	6.4	3.83	20.9	7 24.1		15	18.2	+8 12.7	+1.3881	0.5144	0.2556	17.8
252 B. Aquarii	5.8	3.85	22.3	5 26.1		21	25.5	+9 50.9	+0.8885	0.5118	0.2574	18.4
197 G. Aquarii	6.3	+3.86	+22.5	5 15.5		22	30.7	+8 47.7	+0.9829	0.5113	+0.2576	18.8
22 B. Piscium	6.4	3.92	25.5	0 10.1	15	12	10.4	+4 28.0	-0.8778	0.5071	0.2588	3.8
9 Piscium	6.4	3.93	25.8	0 39.8		14	7.5	+6 21.6	-1.2574	0.5066	0.2587	31.8
16 Piscium	5.7	3.96	26.5	1 38.3		18	56.6	+11 2.4	-1.0529	0.5057	0.2582	15.8
λ Piscium	4.6	3.99	26.4	1 19.2		21	55.7	-10 3.7	+0.0563	0.5053	0.2577	14.8
19 Piscium	5.4	+4.00	+27.2	3 1.4	16	0	13.3	7 50.0	-1.1734	0.5050	+0.2572	23.4
22 Piscium	5.8	4.04	27.2	2 27.9		3	10.0	+4 58.4	+0.1784	0.5047	0.2564	53.8
25 Piscium	6.2	4.05	27.0	1 37.5		3	45.4	+4 24.0	+1.2285	0.5047	0.2563	100.8
51 Piscium	5.6	4.22	29.1	6 29.7	17	0	35.0	8 10.3	+1.2547	0.5053	0.2466	100.2
136 B. Piscium	6.5	4.26	29.6	8 54.0		5	14.0	3 39.3	-0.2032	0.5060	0.2435	53.2
75 Piscium	6.3	+4.41	+30.4	+12 30.6		18	31.3	+9 14.8	-0.9508	0.5089	+0.2327	9.7
7 Piscium	3.7	4.56	30.4	14 55.0	18	7	25.1	2 14.1	-0.6554	0.5129	0.2195	6.2
101 Piscium	6.2	4.57	30.0	14 14.1		9	37.7	0 5.4	+0.5694	0.5137	0.2169	184.1
105 Piscium	6.1	4.62	30.2	15 59.0		11	36.7	+1 50.0	-0.9111	0.5144	0.2146	7.4
3 Arietis	6.4	4.66	30.1	16 59.8		15	7.6	+5 14.7	-1.2715	0.5157	0.2103	37.3
4 Arietis	5.8	+4.66	+30.0	+16 32.5		15	56.5	+6 2.1	-0.6037	0.5160	+0.2092	11.8
1 Arietis	5.1	4.72	29.7	17 24.7		20	34.7	+10 31.9	-0.6002	0.5178	0.2032	11.4
35 B. Arietis	6.4	4.75	29.5	17 51.2		23	46.7	+10 21.9	-0.4419	0.5192	0.1988	119.6
47 B. Arietis	6.5	4.77	29.3	17 38.0	19	1	48.9	8 23.4	+0.2014	0.5200	0.1959	54.4
20 H. Arietis	6.4	4.78	28.9	16 50.0		2	37.5	7 36.3	+1.2360	0.5204	0.1948	100.7
15 Arietis	5.9	+4.81	+29.3	+19 6.5		3	13.6	7 1.3	-1.1408	0.5206	+0.1939	25.7
8 Arietis	5.6	4.85	28.9	19 31.0		6	57.8	3 24.0	-0.8761	0.5222	0.1883	6.7
26 Arietis	6.2	4.92	28.1	19 29.2		13	8.5	+2 35.3	+0.2908	0.5248	0.1787	60.1
ν Arietis	5.4	4.99	27.8	21 36.1		17	7.8	+6 27.1	-1.3373	0.5267	0.1721	59.4
μ Arietis	5.7	4.97	27.4	19 39.5		18	52.9	+8 8.9	+1.1020	0.5274	0.1692	100.1
ε Arietis (mean)	4.6	+5.07	+26.3	+21 0.5	20	3	1.3	7 58.1	+0.9346	0.5310	+0.1548	100.21
64 Arietis	5.8	5.26	24.3	24 25.8		14	55.7	+3 33.3	-1.1339	0.5360	0.1321	28.6
66 Arietis	6.1	5.22	23.8	22 31.1		16	54.4	+5 28.1	+1.2373	0.5368	0.1281	85.4
7 Tauri	5.9	5.29	23.4	24 11.2		19	42.1	+8 10.3	-0.2573	0.5378	0.1224	25.3
11 Tauri	6.1	5.34	22.8	25 3.7		22	38.9	+11 1.3	-0.8741	0.5389	0.1163	8.6
16 Tauri	5.4	+5.32	+22.3	+24 1.7	21	0	32.7	-11 8.5	+0.4856	0.5396	+0.1123	75.0
17 Tauri	3.8	5.32	22.3	23 51.2		0	34.8	-11 6.5	+0.6844	0.5396	0.1122	100.11
18 Tauri	5.6	5.34	22.3	24 34.8		0	42.2	-10 59.4	-0.1062	0.5397	0.1120	37.20
9 Tauri	4.3	5.33	22.3	24 12.5		0	43.8	-10 57.8	+0.3086	0.5397	0.1119	62.0
20 Tauri	4.1	5.32	22.2	24 6.5		1	1.2	-10 41.0	+0.4501	0.5398	0.1113	7.2
21 Tauri	5.8	+5.33	+22.2	+24 17.8		1	3.3	-10 38.0	+0.2470	0.5398	+0.1112	58.12
22 Tauri	6.5	5.33	22.2	24 16.2		1	7.2	-10 35.2	+0.2835	0.5398	0.1111	60.19
23 Tauri	4.3	5.31	22.2	23 41.4		1	15.5	-10 27.2	+0.9402	0.5399	0.1108	100.10
7 Tauri	3.0	5.32	22.1	23 51.0		1	47.7	-9 56.0	+0.8237	0.5401	0.1097	100.10
27 Tauri	3.7	5.33	21.9	23 48.0		2	34.6	-9 10.7	+0.9628	0.5403	0.1080	100.26
28 Tauri	5.2	+5.33	+21.9	+23 53.0		2	35.2	-9 10.1	+0.8714	0.5403	+0.1080	100.22
14 H. Tauri	5.3	5.38	21.7	25 19.8		3	5.2	8 47.1	-0.6762	0.5405	0.1069	5.03
ρ Tauri	5.6	5.47	19.6	26 15.9		12	33.0	+2 27.8	-0.7997	0.5434	0.0861	3.64
χ Tauri	5.3	5.47	18.3	25 26.1		17	56.7	+5 40.6	+0.5538	0.5448	0.0739	182.8
17 B. Aurigæ	6.0	5.61	14.5	27 45.6	22	7	38.5	5 5.4	-1.2340	0.5473	0.0419	45.62
38 B. Aurigæ	6.5	+5.61	+13.0	+27 34.9		13	0.4	0 5.5	-0.8455	0.5478	+0.0291	7.62
47 B. Aurigæ	6.0	5.63	12.7	27 55.7		15	18.7	+2 19.1	-1.1693	0.5479	0.0236	30.62
354 B. Tauri	6.4	5.63	11.0	27 52.5		20	23.5	+7 13.5	-1.0223	0.5481	+0.0114	21.62
107 B. Aurigæ	6.5	5.62	9.0	27 36.6	23	3	8.7	-10 15.1	-0.7057	0.5479	0.0049	2.60
112 B. Aurigæ	5.7	5.58	8.9	26 52.5		3	42.5	+9 42.4	+0.1099	0.5478	0.0061	145.4
125 Tauri	5.1	+5.54	+8.8	+25 51.2		4	53.9	8 33.5	+1.2359	0.5477	0.0091	180.48

[Eph 15]

ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

NOVEMBER.

THE STAR'S				AT CONJUNCTION IN R. A.							Limiting Par- allels.	
Name.	Mag.	Red'n's from 1915.0.		Apparent Declina- tion.	Washington Mean Time.	Hour Angle, H		Y	x'	y'	N.	S.
		$\Delta\alpha$	$\Delta\delta$			d h m	h m					
B. Tauri	5.6	+5.62	+7.0	+27 56.7	23 9 56.6	3 41.1	-1.1671	0.5472	-0.0212	-35	-62	
Tauri	4.6	5.60	6.7	27 35.7	11 1.1	2 38.8	-0.8016	0.5471	0.0238	-4	-62	
Tauri	4.7	5.52	6.4	25 50.8	13 9.9	0.34.3	+0.9751	0.5468	0.0289	+90	+37	
B. Tauri	6.1	5.59	5.7	27 34.2	14 30.2	0 43.2	-0.8715	0.5465	0.0321	-9	-62	
Geminorum	3.2	5.39	+0.4	25 13.0	24 10 10.6	4 16.2	+0.6615	0.5417	0.0775	+90	+13	
Geminorum	5.7	+5.36	1.2	+25 20.0	15 26.5	0 49.1	-0.0734	0.5400	-0.0802	+39	-27	
Geminorum	6.2	5.37	1.7	26 11.6	17 3.2	2 22.7	-1.0083	0.5394	0.0927	-18	-64	
Geminorum	6.3	5.37	1.8	26 1.8	17 21.7	2 40.6	-0.8560	0.5393	0.0934	-7	-64	
Geminorum	5.2	5.29	1.8	24 20.2	18 46.0	4 2.1	+0.8886	0.5388	0.0064	+90	+24	
Geminorum	5.8	5.25	3.2	24 16.3	23 27.5	8 34.3	+0.4857	0.5370	0.1064	+75	+1	
Geminorum	6.1	+5.28	-3.7	+25 2.0	25 0 30.2	9 34.9	-0.4709	0.5366	-0.1086	+17	-51	
Geminorum	5.1	5.24	4.8	25 12.8	4 38.5	10 24.9	-1.1380	0.5350	0.1171	-29	-65	
Geminorum	6.0	5.15	4.3	23 6.5	4 40.4	10 23.0	+1.1808	0.5350	0.1172	+90	+45	
B. D.+23° 1744	6.4	5.11	5.4	23 4.1	9 7.2	6 4.9	+0.6924	0.5332	0.1262	+90	+10	
B. Geminorum	6.3	5.15	6.5	24 33.0	11 40.0	3 37.1	-1.2741	0.5321	0.1312	-47	-65	
B. Geminorum	6.0	+5.14	-6.6	+24 24.8	12 7.7	3 10.3	-1.1848	0.5319	-0.1321	-33	-66	
B. Geminorum	6.3	5.08	6.5	23 12.9	12 59.9	2 19.8	+0.0262	0.5316	0.1338	+44	-26	
B. Geminorum	6.3	5.05	6.6	22 35.9	14 9.3	1 12.6	+0.5507	0.5311	0.1360	+80	+1	
Geminorum	6.3	5.05	7.4	23 21.0	16 38.1	1 11.4	-0.6228	0.5300	0.1407	+8	-63	
Canceri	5.5	4.90	9.5	21 49.6	26 1 58.0	10 13.7	-0.3336	0.5260	0.1577	+24	-48	
B. Canceri	6.0	+4.80	-10.7	+21 0.8	8 9.1	7 46.9	-0.4462	0.5234	-0.1684	+19	-56	
NEPTUNE	7.7	...	...	19 17.8	9 53.8	6 5.4	+1.1460	0.5233	0.1714	+90	+34
Canceri	5.5	4.72	12.0	20 43.6	14 16.9	1 50.5	-1.1927	0.5209	0.1784	-31	-69	
B. Canceri	6.5	4.05	12.6	19 58.1	18 6.7	1 52.3	-1.0521	0.5194	0.1843	-18	-70	
Canceri	6.3	4.05	12.5	19 50.6	18 9.4	1 54.9	-0.9230	0.5193	0.1844	-9	-70	
Canceri	4.2	+4.58	-12.8	+18 27.8	20 17.7	3 59.3	+0.1915	0.5185	-0.1876	+54	-24	
B. Canceri	6.1	4.57	13.4	19 8.8	23 20.2	6 56.2	-1.1335	0.5174	0.1921	-24	-71	
Canceri (var.)	6.2	4.49	13.4	17 33.1	27 1 41.6	9 13.3	+0.1558	0.5165	0.1955	+52	-27	
Canceri	6.4	4.29	14.2	15 20.1	10 20.4	6 23.5	+0.8334	0.5136	0.2073	+90	+7	
Canceri	5.6	4.30	14.7	15 17.4	11 49.1	4 57.5	+0.5737	0.5132	0.2092	+80	-7	
B. Canceri	6.4	+4.28	-15.4	+15 43.7	14 54.1	1 58.0	-0.5537	0.5123	-0.2130	+14	-68	
Leonis	6.2	4.16	16.4	14 45.3	22 26.9	5 21.4	-1.1347	0.5103	0.2218	-23	-75	
Leonis	6.5	4.14	16.6	14 43.6	23 33.4	6 25.9	-1.3507	0.5101	0.2231	-47	-73	
Leonis	5.8	4.04	16.4	12 11.8	28 3 55.1	10 39.9	+0.4072	0.5092	0.2278	+67	-18	
Leonis	6.4	4.02	16.4	11 57.4	4 27.8	+11 11.7	+0.5425	0.5091	0.2283	+77	-11	
Leonis (var.)	5-10	+4.02	-16.5	+11 49.1	4 31.7	+11 15.4	+0.6772	0.5091	-0.2284	+90	-4	
Leonis	4.6	3.86	17.6	10 24.6	15 8.6	2 26.3	-0.2827	0.5076	0.2385	+28	-56	
Leonis	5.9	3.74	18.4	9 12.7	0 12.9	6 22.1	-1.1915	0.5072	0.2458	-26	-81	
Leonis	5.2	3.64	18.3	7 23.2	5 13.3	+11 13.8	-0.4774	0.5073	0.2493	+18	-70	
Sextantis	6.1	3.57	18.2	5 11.3	9 41.6	8 25.8	+0.7432	0.5077	0.2521	+90	-3	
Sextantis	6.3	+3.57	-18.9	+6 49.0	11 7.0	7 2.9	-1.3470	0.5078	-0.2529	-42	-82	
Leonis	5.0	3.45	18.8	4 4.1	18 39.4	0 16.3	-0.3502	0.5090	0.2567	+25	-62	
Leonis	5.7	3.37	18.6	2 24.7	21 58.2	3 29.2	+0.5481	0.5097	0.2581	+77	-15	
Leonis	5.4	3.34	19.2	2 28.4	30 3 18.6	8 40.1	-0.8086	0.5110	0.2600	-5	-88	
Leonis	6.0	3.32	19.0	2 6.7	4 9.1	9 29.2	-0.7370	0.5113	0.2602	+5	-88	
B. Leonis	6.3	+3.28	-18.7	+0 35.6	6 24.5	+11 40.6	+0.2711	0.5120	-0.2608	+58	-29	
Leonis	5.5	3.29	19.2	+1 52.2	6 46.9	-11 57.7	-1.1660	0.5121	0.2609	-23	-88	
Leonis	4.5	3.21	18.9	-0 21.6	13 22.4	5 34.1	-0.5511	0.5146	0.2621	+14	-77	
B. Leonis	6.2	+3.18	-18.4	-1 58.3	14 6.9	4 50.9	+0.9386	0.5149	-0.2622	+88	+6	

DECEMBER.

B. Virginis	6.5	+2.99	-18.5	-5 15.1	1 8 0.0	-11 30.8	-0.3453	0.5242	-0.2609	+25	-62
Virginis	5.3	2.90	-17.9	8 59.3	17 26.0	2 22.6	+1.0489	0.5305	0.2574	+81	+15
Virginis	4.8	2.88	-18.5	7 32.0	20 2.4	0 8.7	-1.1105	0.5326	0.2561	-20	-90
B. Virginis	6.0	+2.83	-17.7	-11 11.6	2 3 6.3	+6 58.7	+0.8317	0.5383	-0.2517	+79	+1

[Eph 15]

ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

DECEMBER.

THE STAR'S					AT CONJUNCTION IN R. A.					Limiting Parallaxes.
Name.	Mag.	Red'ns from 1915.0.		Apparent Declination.	Washington Mean Time.	Hour Angle, <i>H</i>	<i>Y</i>	<i>x'</i>	<i>y'</i>	
		$\Delta\alpha$	$\Delta\delta$		d h m	h m				N. S.
ψ Virginis	5.0	+2.83	-18.3	9 5.0	2 3 7.5	+ 6 59.8	-1.3223	0.5383	-0.2516	-41-86
75 Virginis	5.6	2.70	17.0	14 55.8	20 29.5	0 13.7	+0.3670	0.5542	0.2349	+58-23
83 Virginis	5.6	2.69	16.8	15 45.4	3 1 32.5	+ 4 38.6	+0.0265	0.5592	0.2283	+38-42
85 Virginis	6.1	2.68	16.9	15 20.7	2 0.9	+ 5 6.0	-0.4938	0.5597	0.2277	+11-74
43 H. Virginis	5.5	2.63	16.1	17 48.5	14 32.1	- 6 50.5	-0.7577	0.5727	0.2076	- 6-90
231 G. Virginis	6.4	+2.64	-15.9	-18 11.7	15 12.8	- 6 11.3	-0.5132	0.5735	-0.2064	+ 8-76
236 G. Virginis	5.7	2.63	15.9	18 19.6	15 51.5	- 5 34.1	-0.5149	0.5741	0.2052	+ 8-76
9 G. Libræ	6.5	2.63	15.4	20 4.3	22 23.7	+ 0 43.1	-0.0814	0.5811	-0.1924	+28-47
NEW MOON.										
189 B. Sagittarii	6.1	+3.05	-1.2	-24 47.5	8 1 25.3	0 32.1	-0.0505	0.6057	+0.1160	+22-46
ψ Sagittarii	4.9	3.08	0.9	25 24.3	4 6.9	+ 2 2.7	+0.8771	0.6034	0.1239	+65-8
208 B. Sagittarii	6.1	3.07	-0.7	24 19.5	4 8.0	+ 2 3.8	-0.1844	0.6034	0.1240	+15-54
χ Sagittarii	4.9	3.10	0.0	24 40.5	7 46.0	+ 5 32.6	+0.6297	0.6001	0.1343	+62-8
49 Sagittarii	5.5	3.08	+0.2	24 7.8	7 51.5	+ 5 37.9	+0.1044	0.6000	0.1345	+32-37
53 Sagittarii	6.1	+3.12	+1.3	-23 37.3	13 18.1	+10 51.0	+0.3753	0.5948	+0.1491	+48-22
274 B. Sagittarii	6.3	3.12	1.4	23 37.4	13 24.8	+10 57.4	+0.3946	0.5947	0.1494	+50-21
329 B. Sagittarii	6.1	3.18	3.1	22 58.2	21 41.1	- 5 6.2	+1.0718	0.5862	0.1698	+67-21
336 B. Sagittarii	6.5	3.18	3.4	22 50.0	22 36.7	+ 4 12.9	+1.0944	0.5852	0.1720	+67-23
6 Capricorni	5.5	3.15	5.3	19 23.0	9 54.5	+1 50.2	-1.2138	0.5785	-0.1858	-41-90
0 Capricorni	5.6	+3.18	+6.2	-18 51.8	9 11.5	+ 5 57.3	-0.9204	0.5739	+0.1944	-17-90
v Capricorni	5.3	3.21	7.2	18 26.2	13 23.9	+10 0.2	-0.5148	0.5694	0.2023	+ 7-70
81 B. Capricorni	6.4	3.24	7.9	18 20.9	17 18.1	-10 14.3	+0.1990	0.5652	0.2092	+45-32
19 Capricorni	5.7	3.26	8.4	18 14.6	19 37.3	- 8 0.2	+0.5846	0.5628	0.2130	+67-11
94 B. Capricorni	5.7	3.24	9.2	16 21.4	20 52.2	- 6 48.0	-1.0474	0.5614	0.2150	-22-90
21 Capricorni	6.5	+3.27	+9.0	-17 51.6	22 13.5	- 5 29.5	+0.7598	0.5600	+0.2170	-72-1
6 Capricorni	4.2	3.29	9.4	17 34.1	10 0 25.3	- 3 22.4	+0.0474	0.5578	0.2203	+72-10
URANUS	6.0	...	...	17 37.9	0 34.5	- 3 13.6	+1.0443	0.5561	0.2201	+72-17
29 Capricorni	5.5	3.28	10.8	15 31.3	4 44.0	+0 47.1	-0.1561	0.5534	0.2263	+20-57
λ Capricorni	5.5	3.33	14.3	11 45.3	18 40.0	- 9 45.5	-0.7204	0.5402	0.2419	+ 2-90
151 B. Capricorni	6.1	+3.37	+14.1	-13 6.9	20 6.9	- 8 21.5	+1.0213	0.5390	+0.2433	+77-14
96 B. Aquarii	6.5	3.34	15.1	10 42.5	21 57.5	- 6 34.6	-0.9906	0.5373	0.2449	-14-90
θ Aquarii	4.3	3.41	17.4	8 12.1	8 59.9	+ 4 6.3	-0.8216	0.5285	0.2526	- 2-90
150 B. Aquarii	6.0	3.42	17.0	9 27.6	9 1.1	+ 4 7.5	+0.4793	0.5285	0.2527	+69-18
ρ Aquarii	5.3	3.42	17.6	8 14.6	10 37.8	+ 5 41.0	-0.3668	0.5274	0.2536	+23-64
170 B. Aquarii	6.0	+3.43	+18.1	- 7 37.2	12 15.3	+ 7 15.5	-0.5991	0.5262	+0.2544	+11-81
186 B. Aquarii	6.1	3.40	18.6	6 59.1	16 2.8	+10 55.8	-0.2889	0.5236	0.2561	+27-59
252 B. Aquarii	5.8	3.55	20.7	5 26.1	3 56.7	-1 32.2	+1.1738	0.5167	0.2595	+81-24
197 G. Aquarii	6.3	3.56	20.8	5 15.5	5 0.6	- 0 30.2	+1.2671	0.5161	0.2597	+85-32
6 G. Piscium	6.2	3.54	21.7	2 50.7	5 30.7	- 0 1.0	-1.1243	0.5159	0.2597	-20-90
22 B. Piscium	6.4	+3.65	+23.9	- 0 10.1	18 25.9	-11 29.0	-0.5791	0.5105	+0.2599	+13-79
κ Piscium	4.9	3.66	24.2	+0 47.8	20 11.3	- 9 46.7	-1.1411	0.5099	0.2596	-21-80
9 Piscium	6.4	3.66	24.3	0 39.7	20 21.2	- 9 37.2	-0.9568	0.5098	0.2596	- 0-80
16 Piscium	5.7	3.69	25.0	1 38.2	1 6.2	- 5 0.5	-0.7576	0.5083	0.2588	+ 3-88
λ Piscium	4.6	3.72	24.9	1 19.1	4 3.0	- 2 8.9	+0.3407	0.5077	0.2580	+62-26
19 Piscium	5.4	+3.74	+25.8	+ 3 1.3	6 18.0	+ 0 3.0	-0.8819	0.5072	+0.2574	- 4-87
22 Piscium	5.8	3.78	25.7	2 27.9	9 13.6	+ 2 52.6	-0.4577	0.5066	0.2564	+70-19
d Piscium	5.4	3.93	28.2	7 43.6	0 16.2	- 6 31.0	-1.3529	0.5053	0.2493	+43-81
136 B. Piscium	6.5	4.05	28.7	8 54.0	11 6.6	+ 4 0.6	+0.0471	0.5058	0.2419	+45-38
75 Piscium	6.3	4.24	29.9	12 30.5	15 0 22.3	- 7 6.7	-0.7202	0.5078	0.2366	+ 5-77
7 Piscium	3.7	+4.42	+30.0	+14 55.0	13 16.6	+ 5 24.9	-0.4494	0.5112	+0.2170	+19-63
101 Piscium	6.2	4.45	29.7	14 14.1	15 29.4	+ 7 33.7	+0.7705	0.5119	0.2144	+90-3
105 Piscium	6.1	4.50	30.1	15 59.0	17 28.6	+ 9 29.4	-0.7130	0.5126	0.2120	+ 5-74
3 Arietis	6.4	4.56	30.2	16 59.8	21 0.1	-11 5.4	-1.0804	0.5138	0.2176	-19-73
4 Arietis	5.8	4.56	30.0	16 32.5	21 49.1	-10 17.8	-0.4144	0.5141	0.2066	+21-39
2 Arietis	5.1	+4.64	+29.8	+17 24.7	16 2 28.2	- 5 47.2	-0.4202	0.5158	+0.2005	+20-58

ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

DECEMBER.

THE STAR'S				AT CONJUNCTION IN R. A.					Limiting Parallels.	
Name.	Mag.	Red'ns from 1915.0.		Apparent Declination.	Washington Mean Time.	Hour Angle, H	Y	α'	γ'	N. S.
		$\Delta\alpha$	$\Delta\delta$		d h m	h m				N. S.
B. Arietis	6.4	+4.69	+29.6	+17 51.2	16 5 40.8	-2 40.4	-0.2683	0.5170	+0.1960	+28-50
B. Arietis	6.5	4.71	29.4	17 38.0	7 43.4	-0 41.5	+0.3710	0.5178	0.1932	+65-16
Arietis	5.9	4.76	29.6	19 6.5	9 8.5	+0 41.0	-0.9747	0.5184	0.1911	-13-71
Arietis	5.6	4.82	29.4	19 31.0	12 53.5	+4 19.1	-0.7178	0.5190	0.1855	+4-70
Arietis	6.2	4.91	28.6	19 29.2	19 5.9	+10 20.0	-0.4370	0.5226	0.1759	+70-10
Arietis	5.4	+5.01	+28.5	+21 36.1	23 6.3	-9 47.0	-1.2012	0.5244	+0.1694	-33-68
Arietis	5.7	4.99	27.8	19 39.5	17 0 51.9	-8 4.7	+1.2370	0.5252	0.1664	+89+44
Arietis (mean)	4.6	5.14	26.9	21 0.5	9 2.5	-0 9.4	+1.0522	0.5289	0.1521	+90+29
Arietis	5.8	5.39	25.4	24 25.9	21 0.1	+11 25.2	-1.0447	0.5341	0.1295	-20-65
Tauri	5.9	5.45	24.4	24 11.2	18 1 47.6	-7 56.7	-0.1771	0.5361	0.1199	+33-36
Tauri	6.1	+5.52	+23.9	+25 3.7	4 45.2	-5 4.9	-0.8010	0.5373	+0.1139	-3-65
Tauri	5.4	5.51	23.2	24 1.8	6 39.4	-3 14.4	+0.5565	0.5380	0.1099	+81+4
Tauri	3.8	5.50	23.2	23 51.2	6 41.6	-3 12.3	+0.7556	0.5380	0.1098	+90+15
Tauri	5.6	5.53	23.3	24 34.8	6 48.9	-3 5.3	-0.0364	0.5381	0.1096	+41-27
Tauri	4.3	5.52	23.2	24 12.5	6 50.5	-3 3.7	+0.3788	0.5381	0.1095	+67-6
Tauri	4.1	+5.52	+23.2	+24 6.6	7 8.0	-2 46.8	+0.5190	0.5382	+0.1080	+78+2
Tauri	5.8	5.52	23.2	24 17.8	7 10.1	-2 44.7	+0.3164	0.5382	0.1088	+62-9
Tauri	6.5	5.52	23.2	24 16.2	7 14.1	-2 40.9	+0.3529	0.5383	0.1087	+65-7
Tauri	4.3	5.51	23.0	23 41.4	7 22.4	-2 32.9	+1.0101	0.5383	0.1084	+90+31
Tauri	3.0	5.52	22.9	23 51.0	7 54.7	-2 1.6	+0.8923	0.5385	0.1072	+90+23
Tauri	3.7	+5.52	+22.8	+23 48.0	8 41.7	-1 16.2	+1.0299	0.5388	+0.1056	+90+33
Tauri	5.2	5.53	22.8	23 53.0	8 42.3	-1 15.6	+0.9383	0.5388	0.1056	+90+26
H. Tauri	5.3	5.58	22.8	25 19.8	9 12.5	-0 46.4	-0.6122	0.5390	0.1045	+8-60
Tauri	5.6	5.73	20.7	26 15.9	18 42.1	+8 24.4	-0.7560	0.5423	0.0839	-1-64
Tauri	5.3	5.76	19.2	25 26.1	19 0 6.7	-10 21.9	-0.5876	0.5440	0.0717	+85+9
B. Aurigæ	6.0	+5.08	+15.7	+27 45.6	13 50.0	+2 53.5	-1.2303	0.5471	+0.0398	-45-62
B. Aurigæ	6.5	6.02	14.0	27 34.9	19 12.2	+8 4.9	-0.8523	0.5479	0.0271	-8-62
B. Aurigæ	6.0	6.06	13.4	27 55.7	21 30.6	+10 18.5	-1.1800	0.5481	0.0216	-37-62
B. Tauri	6.4	6.08	11.8	27 52.5	20 2 35.5	-8 47.1	-1.0440	0.5485	+0.0094	-23-62
B. Aurigæ	6.5	6.11	9.6	27 36.6	9 20.6	-2 15.8	-0.7408	0.5486	-0.0069	0-62
B. Aurigæ	5.7	+6.08	+9.4	+26 52.5	9 54.4	-1 43.1	+0.0732	0.5485	-0.0082	+47-11
B. Aurigæ	5.1	6.04	9.1	25 51.2	11 5.7	-0 34.3	+1.1983	0.5485	0.0111	+86+56
B. Tauri	5.6	6.16	7.5	27 56.7	16 8.1	+4 17.9	-1.2158	0.5482	0.0232	-43-62
Tauri	4.6	6.14	7.2	27 35.7	17 12.6	+5 20.1	-0.8522	0.5481	0.0257	-8-62
Tauri	4.7	6.07	6.5	25 56.8	19 21.2	+7 24.4	+0.9210	0.5479	0.0309	+90+33
B. Tauri	6.1	+6.16	+6.0	+27 34.2	20 41.4	+8 41.8	-0.9280	0.5477	-0.0341	-13-62
Geminorum	3.2	6.05	-0.3	25 13.0	21 16 19.6	+3 40.2	+0.5672	0.5435	0.0797	+83+7
Geminorum	5.7	6.05	2.0	25 28.0	21 34.8	+8 44.9	-0.1777	0.5418	0.0913	+33-33
Geminorum	6.2	6.07	2.5	26 11.6	23 11.3	+10 18.1	-1.1159	0.5413	0.0948	-28-64
Geminorum	6.3	6.07	2.6	26 1.8	23 29.8	+10 36.1	-0.9641	0.5412	0.0955	-15-64
Geminorum	5.2	+5.98	-3.0	+24 20.2	22 0 53.8	+11 57.3	+0.7780	0.5407	-0.0986	+90+17
Geminorum	5.8	5.97	4.4	24 16.2	5 34.8	-7 31.0	+0.3672	0.5390	0.1085	+66-6
Geminorum	6.1	6.00	4.0	25 1.9	6 37.3	-6 30.5	-0.5919	0.5386	0.1107	+10-58
Geminorum	5.1	5.99	6.1	25 12.8	10 45.1	-2 30.8	-1.2660	0.5369	0.1193	-47-65
Geminorum	6.0	5.89	5.9	23 6.5	10 47.0	-2 29.0	+1.0626	0.5369	0.1193	+90+34
B. D. +23° 1744	6.4	+5.87	-7.2	+23 4.1	15 13.4	+1 48.8	+0.5572	0.5351	-0.1283	+81+2
B. Geminorum	6.3	5.86	8.4	23 12.8	19 5.6	+5 33.4	-0.1163	0.5334	0.1358	+36-34
B. Geminorum	6.3	5.82	8.7	22 35.9	20 15.0	+6 40.6	+0.4068	0.5329	0.1381	+68-7
Geminorum	6.3	5.84	9.5	23 21.0	22 43.6	+9 4.4	-0.7722	0.5318	0.1428	-1-67
Canceri	5.5	5.71	12.0	21 49.5	23 8 3.1	-5 53.9	-0.4982	0.5276	0.1597	+16-58
B. Canceri	6.0	+5.64	-13.5	+21 0.8	14 14.3	+0 5.7	-0.6200	0.5248	-0.1702	+9-66
NEPTUNE	7.7	...	...	19 24.5	14 59.0	+0 49.1	+1.0208	0.5255	0.1717	+90+24
Canceri	5.5	5.47	14.5	18 22.7	19 51.2	+5 32.3	+1.3010	0.5222	0.1793	+81+50
B. Canceri	6.5	5.50	15.8	19 58.0	20 12.7	+9 45.7	-1.2439	0.5203	0.1859	-30-70
Canceri	6.3	5.50	15.9	19 50.5	0 15.4	+9 48.3	-1.1145	0.5203	0.1860	-23-70
Canceri	4.2	+5.43	-16.3	+18 27.8	2 24.0	+11 53.1	+0.0003	0.5193	-0.1892	+43-34

[Eph 15]

ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.
DECEMBER.

THE STAR'S					AT CONJUNCTION IN R. A.				
Name.	Mag.	Red'n's from 1915.0.		Apparent Declina- tion.	Washington Mean Time.	Hour Angle, H	Y	x'	y'
		$\Delta\alpha$	$\Delta\delta$						
		s	"	"	d h m	h m			
139 B. Cancri	6.1	+5.43	-17.0	+19 8.7	24 5 27.0	-9 9.5	-1.3334	0.5180	-0.1936
X Cancri (var.)	6.2	5.35	17.2	17 33.0	7 48.9	-6 51.9	-0.0428	0.5170	0.1069
81 Cancri	6.4	5.16	18.4	15 20.0	16 30.2	+1 33.8	+0.6269	0.5135	0.2083
π Cancri	5.6	5.18	18.9	15 17.4	17 59.4	+3 0.4	+0.3644	0.5130	0.2101
227 B. Cancri	6.4	5.17	19.7	15 43.6	21 5.6	+6 1.0	-0.7723	0.5118	0.2139
7 Leonis	6.2	+5.06	-21.0	+14 45.2	25 4 42.0	-10 36.0	-1.3653	0.5093	-0.2223
18 Leonis	5.8	4.93	21.3	12 11.8	10 13.2	-5 14.5	+0.1806	0.5077	0.2279
19 Leonis	6.4	4.91	21.4	11 57.4	10 46.3	-4 42.3	+0.3164	0.5076	0.2284
R Leonis (var.)	5.10	4.92	21.4	11 49.1	10 50.2	+4 38.6	+0.4519	0.5076	0.2285
A Leonis	4.6	4.77	22.9	10 24.5	21 34.8	+5 47.3	-0.5236	0.5052	0.2386
43 Leonis	6.3	+4.62	-23.1	+6 58.1	26 5 36.7	-10 24.5	+1.2635	0.5040	-0.2439
48 Leonis	5.2	4.56	24.0	7 23.1	11 52.9	-4 19.0	-0.7288	0.5035	0.2478
35 Sextantis	6.1	4.48	24.0	5 11.2	16 26.2	+0 6.4	+0.5029	0.5034	0.2503
d Leonis	5.0	4.37	24.7	4 4.0	27 1 35.3	+8 59.8	-0.6044	0.5038	0.2543
p ¹ Leonis	5.7	4.28	24.6	2 24.6	4 58.7	-11 42.7	+0.3046	0.5042	0.2554
75 Leonis	5.4	+4.26	-25.2	+2 28.3	10 26.9	-6 24.0	-1.1602	0.5051	-0.2564
76 Leonis	6.0	4.24	25.1	2 6.6	11 18.7	-5 33.6	-0.9964	0.5052	0.2571
359 B. Leonis	6.3	4.20	24.7	+0 35.5	13 37.5	-3 18.9	+0.0252	0.5057	0.2573
388 B. Leonis	6.3	4.16	24.3	-1 14.3	16 2.6	+0 58.0	+1.3477	0.5063	0.2575
v Leonis	4.5	4.12	25.0	0 21.7	20 46.7	+3 37.8	-0.8065	0.5076	0.2581
431 B. Leonis	6.2	+4.10	-24.5	-1 58.4	21 32.4	+4 22.2	+0.7046	0.5078	-0.2581
78 B. Virginis	6.5	3.91	24.3	5 15.2	28 15 58.1	-1 45.0	-0.5874	0.5156	0.2564
q Virginis	5.3	3.81	23.5	8 59.4	29 1 43.0	+7 42.1	+0.8384	0.5213	0.2521
X Virginis	4.8	3.79	24.1	7 32.1	4 24.7	+10 18.8	-1.3541	0.5232	0.2508
370 B. Virginis	6.0	3.72	22.9	11 11.7	11 43.4	-6 36.3	+0.6291	0.5285	0.2461
69 Virginis	4.9	+3.61	-21.3	-15 32.3	30 3 15.8	+8 25.5	+1.3738	0.5413	-0.2324
75 Virginis	5.6	3.60	21.5	14 55.9	5 44.0	+10 48.7	+0.1811	0.5436	0.2291
83 Virginis	5.6	3.57	21.0	15 45.5	10 57.8	-8 8.1	-0.1570	0.5486	0.2227
85 Virginis	6.1	3.56	21.2	15 20.8	11 27.2	-7 39.8	-0.6854	0.5490	0.2224
87 Virginis	5.8	3.57	20.5	17 26.4	12 15.1	-6 53.6	+1.2730	0.5498	0.2216
89 Virginis	5.1	+3.56	-20.4	-17 43.0	13 20.6	-5 50.3	+1.3136	0.5509	-0.2195
43 H. Virginis	5.5	3.48	19.8	17 48.6	31 0 24.8	+4 50.3	-0.9314	0.5622	0.2023
231 G. Virginis	6.4	3.49	19.5	18 11.8	1 6.8	+5 30.8	-0.6818	0.5629	0.2011
236 G. Virginis	5.7	3.48	19.5	18 19.7	1 46.9	+6 9.4	-0.6823	0.5636	0.2006
9 G. Libræ	6.5	3.46	18.5	20 4.3	8 32.1	-11 20.4	-0.2297	0.5708	0.1874
17 G. Libræ	6.4	+3.43	-18.0	-20 49.3	13 10.1	-6 52.9	-0.3223	0.5757	-0.1779
18 G. Libræ	6.1	3.43	17.8	20 58.4	13 35.4	-6 28.6	-0.2435	0.5761	0.1771
43 B. Libræ	5.7	+3.48	-19.3	-21 2.3	17 39.9	-2 33.6	-0.8810	0.5805	-0.1681

[Eph 15]

OCCULTATIONS VISIBLE AT WASHINGTON DURING THE YEAR 1915.

No.	THE STAR'S		IMMERSION.				EMERSION.				Duration of Occultation.
			Washington.		Angle from—		Washington.		Angle from—		
	Name.	Mag.	Sidereal Time.	Mean Time.	North Point.	Vertex.	Sidereal Time.	Mean Time.	North Point.	Vertex.	
			h m	h m	°	°	h m	h m	°	°	h m
1	A Geminorum	5.1	2 39	7 57	111	170	3 48	9 5	258	318	1 8
2	η Cancri	5.5	12 18	17 30	75	18	13 4	18 16	342	286	0 45
8	75 Virginis	5.6	12 32	17 20	161	175	13 35	18 23	273	271	1 3
11	ε Scorpii	2.9	14 36	19 12	167	190	15 13	19 49	226	242	0 37
19	13 Piscium	6.4	1 39	5 46	87	53	2 40	6 47	198	156	1 1
23	26 Arietis	6.2	0 33	4 25	33	79	1 51	5 42	260	281	1 17
24	7 Tauri	5.9	10 13	13 59	16	325	10 34	14 19	334	285	0 20
27	415 B. Tauri	6.1	0 44	4 19	67	126	1 48	5 23	277	338	1 4
28	39 Geminorum	6.2	1 38	5 10	109	167	2 42	6 13	252	312	1 3
28	40 Geminorum	6.3	2 20	5 52	164	223	2 40	6 12	198	258	0 20
29	9 Cancri	6.2	8 56	12 23	90	56	10 6	13 33	326	273	1 10
31	ψ Leonis	5.6	4 1	7 20	75	128	4 52	8 11	328	22	0 51
2	79 Leonis	5.5	4 50	8 2	113	164	5 46	8 57	302	353	0 55
2	ν Leonis	4.5	13 20	16 30	98	68	14 22	17 32	336	296	1 2
9	58 G. Sagittarii	6.1	14 17	17 0	103	146	15 27	18 9	264	296	1 9
23	136 Tauri	4.6	10 42	12 30	76	17	11 37	13 25	307	252	0 55
25	176 B. Geminorum	6.3	7 3	8 44	121	144	8 29	10 10	282	244	1 26
25	181 B. Geminorum	6.0	7 48	9 29	132	121	9 10	10 50	274	224	1 21
25	82 Geminorum	6.3	13 25	15 5	152	97	14 8	15 47	252	200	0 42
26	η Cancri	5.5	7 34	9 10	164	194	8 31	10 8	249	247	0 57
26	102 B. Cancri	6.5	12 13	13 48	105	49	13 14	14 50	314	258	1 1
26	ε Cancri	6.3	12 22	13 58	127	71	13 24	15 0	292	236	1 2
4	83 Virginis	5.6	7 53	9 6	136	188	8 45	9 58	283	332	0 52
20	18 Tauri	5.6	10 43	10 53	49	0	11 26	11 36	303	258	0 43
20	9 Tauri	4.3	10 52	11 2	152	104	11 14	11 23	199	154	0 21
20	21 Tauri	5.8	11 0	11 9	123	75	11 42	11 51	229	186	0 42
25	9 Cancri	6.2	6 10	6 0	100	151	7 36	7 26	302	321	1 26
25	49 B. Cancri	6.0	15 0	14 49	157	107	15 36	15 25	247	200	0 36
28	37 Sextantis	6.3	9 52	9 31	209	226	10 7	9 45	230	243	0 14
29	ν Leonis	4.5	10 10	9 44	164	188	11 11	10 45	275	282	1 1
31	75 Virginis	5.6	15 28	14 53	98	71	16 34	16 0	320	282	1 7
21	82 Geminorum	6.3	9 38	7 42	157	106	10 39	8 43	256	198	1 1
22	102 B. Cancri	6.5	9 10	7 10	100	79	10 26	8 26	324	278	1 16
22	ε Cancri	6.3	9 20	7 20	121	96	10 42	8 41	302	253	1 21
30	π Scorpii	3.0	10 56	8 24	102	151	11 53	9 21	301	344	0 57
5	ι Capricorni	4.3	17 21	14 29	50	94	18 33	15 40	263	297	1 11
6	ε Aquarii	5.4	16 50	13 53	62	112	17 56	15 0	249	294	1 6
18	187 B. Geminorum	6.3	14 55	11 12	129	82	15 42	11 59	267	224	0 46
21	A Leonis	4.6	14 32	10 38	97	44	15 27	11 32	326	273	0 54
25	75 Virginis	5.6	16 44	12 33	60	22	17 23	13 12	348	305	0 39
29	10 G. Sagittarii	5.7	19 11	14 44	22	5	19 48	15 21	322	298	0 37
e 1	20 Capricorni	6.2	16 27	11 49	112	158	17 20	12 42	210	250	0 53
2	μ Capricorni	5.2	17 18	12 36	120	167	17 58	13 16	190	233	0 40
4	13 Piscium	6.4	20 23	15 32	94	136	21 21	16 30	189	222	0 58
19	359 B. Leonis	6.3	12 44	6 55	153	128	13 54	8 6	285	246	1 10
25	43 Ophiuchi	5.4	20 17	14 3	38	4	21 4	14 50	308	267	0 47
27	51 Sagittarii	5.8	19 34	13 13	32	31	20 36	14 15	286	273	1 2
27	h Sagittarii	4.7	19 38	13 17	77	76	20 54	14 33	238	221	1 16
2	25 Piscium	6.2	17 2	10 22	36	87	17 52	11 12	270	322	0 50
23	10 G. Sagittarii	5.7	19 11	11 8	16	0	19 43	11 40	327	304	0 32
26	URANUS	6.0	23 43	15 28	42	10	0 47	16 31	252	210	1 4
28	252 B. Aquarii	5.8	23 49	15 26	47	31	1 5	16 41	234	202	1 16

NOTE.—The angles of position are counted from the north point and vertex of the Moon's limb toward the east.

† Immersion below the horizon of Washington.

‡ Emersion below the horizon of Washington.

33281°—1915—39

[Eph 15]

OCCULTATIONS VISIBLE AT WASHINGTON DURING THE YEAR 1915.

Date.	THE STAR'S		IMMERSION.				EMERSION.				Duration of Occultation.
			Washington.		Angle from—		Washington.		Angle from—		
	Name.	Mag.	Sidereal Time.	Mean Time.	North Point.	Vertex.	Sidereal Time.	Mean Time.	North Point.	Vertex.	
			h m	h m	°	°	h m	h m	°	°	h m
July 28	197 G. Aquarii	6.3	1 15	16 51	95	61	2 7	17 43	192	151	0 52
Aug. 7	52 Geminorum	6.1	0 24	15 21	53	104	1 9	16 6	311	5	0 45
21	4 Sagittarii	4.7	17 8	7 12	68	97	18 27	8 30	263	277	1 18
21	51 Sagittarii	5.8	17 12	7 15	18	46	17 51	7 54	316	337	0 39
23	42 Capricorni	5.1	0 3	13 57	90	58	0 58	14 52	201	161	0 55
28	101 Piscium	6.2	20 25	10 0	343	35	20 35	10 10	322	15	0 10
29	26 Arietis	6.2	23 56	13 26	67	119	1 16	14 47	228	263	1 21
Sept. 4	82 Geminorum	6.3	1 58	15 4	48	103	2 40	15 47	326	23	0 42
18	4 Capricorni	5.7	19 20	7 32	12	23	20 8	8 20	300	301	0 48
21	197 G. Aquarii	6.3	21 38	9 39	18	38	22 45	10 45	264	267	1 7
27	16 Tauri	5.4	20 54	8 31	65	115	21 49	9 26	256	310	0 55
27	17 Tauri	3.8	20 54	8 31	107	158	21 39	9 16	213	267	0 45
27	7 Tauri	4.3	21 16	8 53	30	82	22 0	9 36	290	345	0 43
27	20 Tauri	4.1	21 21	8 58	66	118	22 18	9 55	253	310	0 58
27	22 Tauri	6.5	21 38	9 15	32	85	22 25	10 2	287	344	0 46
27	21 Tauri	5.8	21 40	9 17	20	74	22 18	9 55	298	355	0 38
29	112 B. Aurigæ	5.7	0 9	11 38	99	156	1 12	12 41	241	302	1 3
Oct. 2	49 B. Cancri	6.0	3 28	14 44	84	141	4 37	15 53	303	0	1 9
13	10 G. Sagittarii	5.7	18 56	5 30	91	77	20 12	6 46	251	223	1 10
15	329 B. Sagittarii	6.1	20 2	6 28	0	359	20 35	7 2	311	302	1 10
15	336 B. Sagittarii	6.5	21 6	7 32	35	20	22 14	8 40	270	242	1 34
16	URANUS	6.0	23 10	9 32	28	0	0 13	10 35	265	227	1 3
16	6 Capricorni †	4.2	1 4	11 26	62	19	2 4	12 26	238	188	1 0
25	7 Tauri	5.3	23 40	9 26	107	166	0 36	10 22	215	274	0 50
30	6 Cancri	4.2	1 44	11 11	134	184	2 34	12 0	251	304	0 49
30	X Cancri (var.)	6.2	8 22	17 48	140	155	9 46	19 11	284	257	1 24
Nov. 18	101 Piscium	6.2	0 30	8 42	80	106	1 48	10 0	210	202	1 18
19	26 Arietis	6.2	5 37	13 44	88	33	6 51	14 58	240	184	1 14
24	8 Geminorum	3.2	0 40	8 28	148	202	1 12	9 0	210	266	0 32
25	187 B. Geminorum	6.3	3 35	11 19	51	110	4 28	12 11	328	26	0 53
27	π Cancri	5.6	2 39	10 15	174	224	3 1	10 37	218	270	0 22
Dec. 8	ψ Sagittarii	4.9	21 33	4 27	107	78	22 25	5 18	209	172	0 55
11	150 B. Aquarii †	6.0	3 17	9 58	105	56	3 57	10 38	196	144	0 40
13	22 Piscium	5.8	3 25	9 58	99	52	4 17	10 50	200	150	0 50
14	136 B. Piscium	6.5	5 54	12 23	28	335	6 42	13 11	285	233	0 48
16	47 B. Arietis	6.5	0 21	6 43	42	84	1 44	8 5	252	263	1 23
18	17 Tauri	3.8	22 32	4 46	99	156	23 28	5 42	217	276	0 56
18	16 Tauri	5.4	22 34	4 48	58	115	23 38	5 52	288	317	1 4
18	7 Tauri	4.3	23 3	5 17	23	81	23 50	6 5	202	351	0 48
18	20 Tauri	4.1	23 5	5 20	61	120	0 14	6 28	254	313	1 8
18	22 Tauri	6.5	23 28	5 42	28	87	0 22	6 36	286	346	0 54
18	21 Tauri	5.8	23 30	5 44	16	75	0 13	6 27	299	358	0 43
20	112 B. Aurigæ	5.7	2 31	8 37	34	95	3 26	9 32	311	9	0 55
21	8 Geminorum	3.2	11 10	17 11	103	44	12 13	18 13	294	238	1 1
22	B. D.+23° 1744	6.4	9 43	15 40	132	78	10 57	16 54	279	220	1 14
24	81 Cancri	6.4	10 58	16 47	124	83	12 15	18 4	305	253	1 17
25	18 Leonis †	5.8	2 27	8 13	84	132	3 19	9 5	313	4	0 51
25	19 Leonis †	6.4	3 1	8 47	118	169	3 59	9 45	281	334	0 58
25	R Leonis (var.)	5-10	3 16	9 2	149	200	4 2	9 48	251	304	0 46
26	35 Sextantis	6.1	10 2	15 43	119	132	11 24	17 5	321	305	1 22
27	359 B. Leonis	6.3	5 56	11 34	76	127	6 42	12 20	344	34	0 46

NOTE.—The angles of position are counted from the north point and vertex of the Moon's limb toward the east.

† Immersion below the horizon of Washington.

‡ Emersion below the horizon of Washington.

EPHEMERIS FOR PHYSICAL OBSERVATIONS OF THE SUN.

FOR WASHINGTON MEAN NOON.

Date.	<i>P</i>	<i>B</i> ₀	<i>L</i> ₀	Date.	<i>P</i>	<i>B</i> ₀	<i>L</i> ₀
	°	°	°		°	°	°
Jan. 1	+ 2.14	-3.13	88.24	July 5	- 1.01	+3.40	166.47
6	- 0.30	3.70	22.39	10	+ 1.26	3.92	100.29
11	2.72	4.24	316.55	15	3.51	4.41	34.13
16	5.09	4.74	250.72	20	5.72	4.87	327.97
21	7.40	5.21	184.88	25	7.87	5.30	261.82
26	- 9.63	-5.64	119.05	30	+ 9.95	+5.70	195.68
31	11.76	6.02	53.22	Aug. 4	11.95	6.05	129.56
Feb. 5	13.78	6.35	347.38	9	13.85	6.36	63.45
10	15.68	6.64	281.55	14	15.65	6.63	357.35
15	17.44	6.87	215.71	19	17.33	6.85	291.26
20	-19.06	-7.05	149.87	24	+18.89	+7.03	225.19
25	20.54	7.17	84.02	29	20.32	7.15	159.13
Mar. 2	21.86	7.24	18.16	Sept. 3	21.62	7.23	93.08
7	23.02	7.25	322.28	8	22.78	7.25	27.05
12	24.02	7.20	246.39	13	23.79	7.22	321.03
17	-24.85	-7.10	180.49	18	+24.64	+7.14	255.02
22	25.51	6.95	114.58	23	25.34	7.01	189.02
27	25.99	6.75	48.64	28	25.87	6.82	123.03
Apr. 1	26.30	6.50	342.68	Oct. 3	26.23	6.58	57.06
6	26.43	6.20	276.70	8	26.41	6.29	351.09
11	-26.37	-5.85	210.71	13	+26.41	+5.96	285.13
16	26.13	5.46	144.69	18	26.22	5.58	219.18
21	25.71	5.03	78.66	23	25.84	5.15	153.23
26	25.11	4.57	12.60	28	25.27	4.69	87.29
May 1	24.32	4.08	306.52	Nov. 2	24.50	4.19	21.36
6	-23.35	-3.56	240.43	7	+23.54	+3.66	315.44
11	22.20	3.02	174.32	12	22.38	3.10	249.52
16	20.88	2.45	108.19	17	21.02	2.51	183.61
21	19.40	1.87	42.05	22	19.48	1.90	117.70
26	17.77	1.28	335.90	27	17.76	1.28	51.80
31	-15.99	0.68	269.73	Dec. 2	+15.88	0.65	345.90
June 5	14.09	-0.08	203.56	7	13.85	+0.01	280.02
10	12.08	+0.52	137.38	12	11.70	-0.63	214.14
15	9.97	1.12	71.20	17	9.44	1.27	148.26
20	7.79	1.71	5.02	22	7.09	1.90	82.39
25	- 5.56	+2.29	298.83	27	+ 4.69	-2.51	16.53
30	- 3.29	+2.85	232.65	32	+ 2.26	-3.10	310.68

In the above table, *P* is the position-angle of the axis of rotation measured eastward from the north point of the disk, while *L*₀ and *B*₀ are the heliographic longitudes and latitudes, respectively, of the center of the disk. The longitudes are reckoned from the Solar Meridian which passes through the ascending node of the Sun's equator on the ecliptic, on Jan. 1, 1854, Greenwich Mean Noon.

EPHEMERIS FOR PHYSICAL OBSERVATIONS OF THE MOON.
FOR WASHINGTON MEAN MIDNIGHT.

Date.	The Earth's Selenographic—		Physical Libration.		The Sun's Selenographic—		C	
	Long.	Lat.	Long.	Lat.	Colong.	Lat.		
Jan.	1	-4.44	-4.22	-0.01	-0.04	102.58	-1.19	7.00
	2	4.89	2.97	0.01	0.04	114.71	1.16	11.63
	3	5.17	1.55	0.01	0.04	126.84	1.13	15.54
	4	5.26	-0.03	0.01	0.04	138.97	1.10	18.59
	5	5.16	+1.52	0.01	0.04	151.11	1.07	20.74
	6	-4.85	+3.00	-0.01	-0.04	163.25	-1.04	21.96
	7	4.29	4.34	-0.01	0.04	175.40	1.01	22.17
	8	3.48	5.44	0.00	0.04	187.56	0.98	21.27
	9	2.44	6.22	0.00	0.04	199.72	0.95	19.14
	10	-1.19	6.63	0.00	0.04	211.89	0.92	15.66
	11	+0.21	+6.61	0.00	-0.04	224.07	-0.89	10.87
	12	1.64	6.16	0.00	0.04	236.25	0.87	5.11
	13	3.00	5.32	0.00	0.04	248.44	0.84	358.94
	14	4.18	4.15	0.00	0.04	260.63	0.82	353.06
	15	5.07	2.74	0.00	0.04	272.82	0.80	347.97
	16	+5.61	+1.19	0.00	-0.04	285.01	-0.78	343.94
	17	5.77	-0.38	0.00	0.04	297.20	0.76	340.97
	18	5.55	1.90	0.00	0.04	309.38	0.74	339.02
	19	4.98	3.28	0.00	0.04	321.56	0.73	337.98
	20	4.12	4.47	0.00	0.04	333.74	0.71	337.81
	21	+3.05	-5.45	-0.01	-0.04	345.91	-0.70	338.49
	22	1.83	6.18	0.01	0.04	358.07	0.68	340.04
	23	+0.55	6.64	0.01	0.04	10.23	0.67	342.48
	24	-0.71	6.81	0.01	0.04	22.38	0.65	345.82
	25	1.90	6.70	0.01	0.04	34.53	0.63	349.99
	26	-2.94	-6.29	-0.01	-0.04	46.67	-0.61	354.84
	27	3.79	5.58	0.01	0.04	58.81	0.59	0.07
	28	4.42	4.60	0.01	0.04	70.94	0.56	5.30
	29	4.80	3.37	0.01	0.04	83.07	0.53	10.18
	30	4.94	1.94	0.01	0.04	95.20	0.50	14.40
	31	-4.84	-0.38	-0.01	-0.04	107.33	-0.46	17.70
Feb.	1	4.51	+1.22	0.01	0.04	119.47	0.43	20.26
	2	3.97	2.78	0.01	0.04	131.60	0.39	21.76
	3	3.26	4.19	0.01	0.04	143.74	0.35	22.24
	4	2.40	5.36	0.01	0.04	155.89	0.31	21.61
	5	-1.43	+6.21	-0.01	-0.04	168.04	-0.28	19.76
	6	-0.39	6.68	0.01	0.04	180.20	0.24	16.65
	7	+0.67	6.75	0.01	0.04	192.37	0.20	12.27
	8	1.71	6.40	0.01	0.04	204.54	0.17	6.86
	9	2.68	5.67	0.01	0.04	216.72	0.14	0.91
	10	+3.52	+4.59	-0.01	-0.04	228.91	-0.11	355.03
	11	4.19	3.26	0.01	0.04	241.10	0.08	349.74
	12	4.64	1.76	0.01	0.04	253.30	0.05	345.36
	13	4.83	+0.18	0.01	0.04	265.50	-0.02	342.01
	14	4.75	-1.38	0.01	0.04	277.69	0.00	339.66
	15	+4.39	-2.84	-0.01	-0.04	289.89	+0.03	338.26
	16	+3.77	-4.13	-0.01	-0.04	302.09	+0.05	337.75

EPHEMERIS FOR PHYSICAL OBSERVATIONS OF THE MOON.

FOR WASHINGTON MEAN MIDNIGHT.

ite.	The Earth's Selenographic—		Physical Libration.		The Sun's Selenographic—		C
	Long.	Lat.	Long.	Lat.	Colong.	Lat.	
	*	*	*	*	*	*	*
16	+3.77	-4.13	-0.01	-0.04	302.09	+0.05	337.75
17	2.92	5.20	0.01	0.04	314.28	0.07	338.12
18	1.87	6.02	0.01	0.04	326.47	0.09	339.36
19	+0.69	6.57	0.01	0.04	338.65	0.11	341.49
20	-0.57	6.84	0.01	0.04	350.83	0.12	344.52
21	-1.84	-6.81	-0.02	-0.04	3.00	+0.14	348.41
22	3.03	6.49	0.02	0.04	15.17	0.17	353.02
23	4.09	5.87	0.02	0.04	27.33	0.19	358.10
24	4.93	4.99	0.02	0.04	39.48	0.21	3.33
25	5.51	3.85	0.02	0.04	51.63	0.23	8.35
26	-5.77	-2.49	-0.02	-0.04	63.78	+0.26	12.85
27	5.69	-0.96	0.02	0.04	75.92	0.29	16.60
28	5.26	+0.66	0.02	0.04	88.06	0.32	19.46
1	4.51	2.28	0.02	0.04	100.20	0.35	21.36
2	3.48	3.78	0.02	0.04	112.35	0.39	22.22
3	-2.26	+5.06	-0.02	-0.04	124.49	+0.43	21.94
4	-0.93	6.02	0.02	0.04	136.64	0.46	20.42
5	+0.41	6.59	0.02	0.04	148.80	0.50	17.56
6	1.67	6.74	0.02	0.04	160.96	0.53	13.40
7	2.78	6.48	0.01	0.04	173.13	0.56	8.17
8	+3.69	+5.82	-0.01	-0.04	185.30	+0.59	2.32
9	4.37	4.82	0.01	0.04	197.49	0.63	356.44
10	4.81	3.57	0.01	0.04	209.68	0.66	351.06
11	5.03	2.14	0.01	0.04	221.88	0.69	346.51
12	5.02	+0.61	0.01	0.04	234.08	0.71	342.92
13	+4.80	-0.93	-0.01	-0.04	246.29	+0.74	340.30
14	4.38	2.39	0.01	0.04	258.50	0.76	338.60
15	3.77	3.72	0.01	0.04	270.71	0.79	337.80
16	2.99	4.85	0.01	0.04	282.92	0.81	337.87
17	2.05	5.74	0.01	0.04	295.13	0.83	338.81
18	+0.96	-6.36	-0.02	-0.04	307.34	+0.85	340.65
19	-0.24	6.70	0.02	0.04	319.54	0.86	343.40
20	1.51	6.75	0.02	0.04	331.74	0.87	347.02
21	2.79	6.51	0.02	0.04	343.94	0.89	351.38
22	4.02	6.00	0.02	0.04	356.13	0.90	356.29
23	-5.13	-5.21	-0.02	-0.04	8.32	+0.92	1.43
24	6.04	4.18	0.02	0.04	20.50	0.93	6.48
25	6.67	2.92	0.02	0.04	32.67	0.95	11.13
26	6.94	-1.49	0.02	0.04	44.84	0.97	15.15
27	6.81	+0.07	0.02	0.04	57.00	0.99	18.37
28	-6.23	+1.67	-0.02	-0.04	69.16	+1.01	20.69
29	5.22	3.21	0.02	0.04	81.32	1.03	22.02
30	3.82	4.58	0.02	0.04	93.48	1.06	22.23
31	2.15	5.66	0.02	0.04	105.63	1.08	21.17
1	-0.34	6.36	0.02	0.04	117.79	1.10	18.72
2	+1.45	+6.62	-0.02	-0.04	129.95	+1.13	14.84
3	+3.07	+6.44	-0.02	-0.04	142.12	+1.15	9.73

EPHEMERIS FOR PHYSICAL OBSERVATIONS OF THE MOON.
FOR WASHINGTON MEAN MIDNIGHT.

Date.	The Earth's Selenographic—		Physical Libration.		The Sun's Selenographic—		C	
	Long.	Lat.	Long.	Lat.	Colong.	Lat.		
Apr.	1	•	•	•	•	•	•	
		—0.34	+6.36	—0.02	—0.04	117.79	+1.10	18.72
	2	+1.45	6.62	0.02	0.04	129.95	1.13	14.84
	3	3.07	6.44	0.02	0.04	142.12	1.15	9.73
	4	4.40	5.85	0.02	0.04	154.29	1.18	3.84
	5	5.39	4.90	0.02	0.04	166.47	1.20	357.82
	6	+6.00	+3.69	—0.01	—0.04	178.66	+1.22	352.24
	7	6.26	2.30	0.01	0.04	190.86	1.24	347.48
	8	6.21	+0.81	0.01	0.04	203.06	1.26	343.68
	9	5.88	—0.69	0.01	0.04	215.27	1.28	340.86
	10	5.34	2.13	0.01	0.04	227.49	1.30	338.95
	11	+4.62	—3.44	—0.01	—0.04	239.71	+1.32	337.91
	12	3.76	4.57	0.01	0.04	251.94	1.34	337.73
	13	2.77	5.48	0.01	0.04	264.16	1.36	338.41
	14	1.69	6.14	0.01	0.04	276.39	1.37	339.99
	15	+0.51	6.52	0.01	0.04	288.62	1.38	342.48
	16	—0.73	—6.62	—0.02	—0.04	300.84	+1.39	345.85
	17	2.02	6.43	0.02	0.04	313.07	1.39	350.02
	18	3.32	5.97	0.02	0.04	325.29	1.40	354.77
	19	4.58	5.25	0.02	0.04	337.50	1.40	359.85
	20	5.73	4.29	0.02	0.04	349.71	1.41	4.87
	21	—6.70	—3.12	—0.02	—0.04	1.92	+1.41	9.99
	22	7.41	1.78	0.02	0.04	14.12	1.41	13.75
	23	7.77	—0.31	0.02	0.04	26.31	1.42	17.21
	24	7.70	+1.22	0.02	0.04	38.49	1.43	19.85
	25	7.15	2.72	0.02	0.04	50.67	1.43	21.99
	26	—6.09	+4.11	—0.02	—0.04	62.85	+1.44	22.31
	27	4.57	5.27	0.02	0.04	75.02	1.45	21.86
	28	2.68	6.08	0.02	0.04	87.19	1.46	20.01
	29	—0.57	6.48	0.01	0.04	99.36	1.47	16.66
30	+1.55	6.42	0.01	0.04	111.54	1.47	11.88	
May	1	+3.50	+5.90	—0.01	—0.04	123.72	+1.48	6.02
	2	5.11	5.00	0.01	0.04	135.90	1.49	359.76
	3	6.29	3.80	0.01	0.04	148.08	1.50	353.81
	4	7.01	2.40	0.01	0.04	160.28	1.50	348.67
	5	7.28	+0.90	0.01	0.04	172.48	1.51	344.54
	6	+7.15	—0.60	—0.01	—0.04	184.69	+1.52	341.44
	7	6.70	2.04	0.01	0.04	196.90	1.53	339.39
	8	5.98	3.35	0.01	0.04	209.12	1.54	338.06
	9	5.08	4.48	0.01	0.04	221.35	1.55	337.67
	10	4.04	5.39	0.01	0.04	233.59	1.55	338.13
	11	+2.90	—6.05	—0.01	—0.04	245.82	+1.56	339.47
	12	1.69	6.45	0.01	0.04	258.06	1.56	341.72
	13	+0.44	6.56	0.01	0.04	270.30	1.56	344.87
	14	—0.84	6.39	0.01	0.04	282.54	1.56	348.85
	15	2.13	5.95	0.01	0.04	294.78	1.56	353.48
	16	—3.41	—5.25	—0.01	—0.04	307.02	+1.56	358.49
	17	—4.63	—4.31	—0.01	—0.04	319.25	+1.55	354

EPHEMERIS FOR PHYSICAL OBSERVATIONS OF THE MOON.

FOR WASHINGTON MEAN MIDNIGHT

etc.	The Earth's Selenographic—		Physical Libration.		The Sun's Selenographic—		C
	Long.	Lat.	Long.	Lat.	Colong.	Lat.	

17	-4.63	-4.31	-0.01	-0.04	319.25	+1.55	3.54
18	5.76	3.18	0.01	0.04	331.49	1.54	8.33
19	6.73	1.88	0.01	0.04	343.72	1.53	12.60
20	7.46	-0.47	0.01	0.04	355.94	1.52	16.21
21	7.88	+1.00	0.01	0.04	8.15	1.51	19.06
22	-7.90	+2.46	-0.01	-0.04	20.36	+1.51	21.08
23	7.46	3.83	0.01	0.04	32.56	1.50	22.18
24	6.51	5.01	0.01	0.04	44.76	1.49	22.23
25	5.08	5.90	0.01	0.04	56.95	1.48	21.04
26	3.24	6.42	0.01	0.04	69.13	1.47	18.41
27	-1.12	+6.49	-0.01	-0.04	81.32	+1.46	14.25
28	+1.08	6.10	0.01	0.04	93.50	1.45	8.74
29	3.16	5.27	-0.01	0.04	105.68	1.44	2.44
30	4.93	4.08	0.00	0.04	117.87	1.43	356.12
31	6.29	2.66	0.00	0.04	130.06	1.43	350.45
1	+7.16	+1.11	0.00	-0.04	142.26	+1.42	345.81
2	7.54	-0.45	0.00	0.04	154.46	1.41	342.28
3	7.48	1.94	0.00	0.04	166.67	1.40	339.80
4	7.05	3.30	0.00	0.04	178.89	1.40	338.28
5	6.31	4.46	0.00	0.04	191.11	1.40	337.65
6	+5.35	-5.40	0.00	-0.04	203.34	+1.39	337.89
7	4.23	6.08	0.00	0.04	215.57	1.39	339.01
8	3.01	6.50	0.00	0.04	227.81	1.39	341.03
9	1.74	6.63	0.00	0.04	240.06	1.38	343.96
10	+0.45	6.48	0.00	0.04	252.31	1.37	347.75
11	-0.83	-6.04	0.00	-0.04	264.56	+1.36	352.25
12	2.08	5.35	-0.01	0.04	276.81	1.35	357.21
13	3.28	4.42	0.01	0.04	289.06	1.34	2.31
14	4.39	3.28	0.01	0.04	301.31	1.32	7.20
15	5.40	1.98	0.01	0.04	313.55	1.30	11.62
16	-6.24	-0.57	-0.01	-0.04	325.79	+1.28	15.38
17	6.88	+0.90	-0.01	0.04	338.03	1.27	18.40
18	7.24	2.35	0.00	0.04	350.26	1.25	20.62
19	7.25	3.71	0.00	0.04	2.49	1.22	21.98
20	6.87	4.90	0.00	0.04	14.71	1.20	22.37
21	-6.06	+5.83	0.00	-0.04	26.92	+1.18	21.66
22	4.83	6.43	0.00	0.04	39.12	1.16	19.66
23	3.23	6.63	0.00	0.04	51.32	1.13	16.20
24	-1.35	6.37	0.00	0.04	63.51	1.11	11.32
25	+0.64	5.67	0.00	0.04	75.70	1.09	5.33
26	+2.57	+4.57	0.00	-0.04	87.89	+1.06	358.91
27	4.28	3.17	0.00	0.04	100.08	1.04	352.82
28	5.65	+1.58	0.00	0.04	112.27	1.01	347.61
29	6.59	-0.06	0.00	0.04	124.47	0.99	343.53
30	7.08	1.65	0.00	0.04	136.67	0.97	340.57
1	+7.12	-3.11	+0.01	-0.04	148.88	+0.95	338.67
2	+6.77	-4.36	+0.01	-0.04	161.09	+0.94	337.72

EPHEMERIS FOR PHYSICAL OBSERVATIONS OF THE MOON.

FOR WASHINGTON MEAN MIDNIGHT.

Date.	The Earth's Selenographic—		Physical Libration.		The Sun's Selenographic—		C	
	Long.	Lat.	Long.	Lat.	Colong.	Lat.		
July	1	+7.12	-3.11	+0.01	-0.04	148.88	+0.95	338.67
	2	6.77	4.36	0.01	0.04	161.09	0.94	337.72
	3	6.10	5.38	0.01	0.04	173.31	0.92	337.69
	4	5.17	6.12	0.01	0.04	185.53	0.90	338.56
	5	4.05	6.59	0.01	0.04	197.76	0.89	340.34
	6	+2.82	-6.76	+0.01	-0.04	210.00	+0.88	343.03
	7	1.54	6.65	0.00	0.04	222.24	0.87	346.61
	8	+0.25	6.25	0.00	0.04	234.48	0.85	350.95
	9	-0.99	5.58	0.00	0.04	246.73	0.84	355.83
	10	2.16	4.66	0.00	0.04	258.99	0.82	0.95
	11	-3.23	-3.52	0.00	-0.04	271.24	+0.80	5.96
	12	4.17	2.21	0.00	0.04	283.49	0.78	10.56
	13	4.95	-0.78	0.00	0.04	295.74	0.76	14.54
	14	5.55	+0.71	0.00	0.04	307.99	0.74	17.77
	15	5.93	2.19	0.00	0.04	320.24	0.71	20.19
	16	-6.07	+3.58	0.00	-0.04	332.48	+0.68	21.76
	17	5.93	4.81	0.00	0.04	344.71	0.65	22.40
	18	5.49	5.79	0.00	0.04	356.94	0.62	22.00
	19	4.73	6.45	0.00	0.04	9.16	0.59	20.42
	20	3.67	6.74	+0.01	0.04	21.37	0.56	17.50
	21	-2.35	+6.61	+0.01	-0.04	33.58	+0.53	13.21
	22	-0.84	6.04	0.01	0.04	45.78	0.49	7.72
	23	+0.76	5.07	0.01	0.04	57.98	0.46	1.52
	24	2.32	3.76	0.01	0.04	70.17	0.43	355.31
	25	3.73	2.22	0.01	0.04	82.36	0.39	349.72
	26	+4.89	+0.55	+0.01	-0.04	94.54	+0.36	345.13
	27	5.72	-1.12	0.01	0.04	106.73	0.33	341.66
	28	6.18	2.68	0.01	0.04	118.93	0.30	339.29
	29	6.26	4.05	0.01	0.04	131.12	0.27	337.94
	30	5.98	5.18	0.01	0.04	143.33	0.25	337.56
	31	+5.37	-6.03	+0.01	-0.04	155.53	+0.23	338.12
Aug.	1	4.49	6.58	0.01	0.04	167.74	0.21	339.62
	2	3.41	6.83	0.01	0.04	179.96	0.19	342.06
	3	2.20	6.79	0.01	0.04	192.19	0.17	345.39
	4	+0.93	6.46	0.01	0.04	204.42	0.15	349.53
	5	-0.34	-5.84	+0.01	-0.04	216.65	+0.13	354.29
	6	1.55	4.97	0.01	0.04	228.89	0.12	359.37
	7	2.63	3.88	0.01	0.04	241.13	0.10	4.46
	8	3.56	2.60	0.01	0.04	253.38	0.08	9.24
	9	4.28	-1.17	0.01	0.04	265.62	0.06	13.46
	10	-4.78	+0.35	+0.01	-0.04	277.87	+0.04	16.96
	11	5.03	1.87	0.01	0.04	290.12	+0.01	19.65
	12	5.04	3.32	0.01	0.04	302.36	-0.02	21.47
	13	4.80	4.60	0.01	0.04	314.60	0.05	22.36
	14	4.33	5.64	0.01	0.04	326.84	0.08	22.22
	15	-3.65	+6.38	+0.01	-0.04	339.07	-0.11	20.92
	16	-2.78	+6.75	+0.01	-0.04	351.29	-0.14	18.35

PHEMERIS FOR PHYSICAL OBSERVATIONS OF THE MOON.

FOR WASHINGTON MEAN MIDNIGHT.

te.	The Earth's Selenographic—		Physical Libration.		The Sun's Selenographic—		C
	Long.	Lat.	Long.	Lat.	Colong.	Lat.	
	°	°	°	°	°	°	°
16	-2.78	+6.75	+0.01	-0.04	351.29	-0.14	18.35
17	1.77	6.71	0.01	0.04	3.51	0.17	14.45
18	-0.65	6.25	0.01	0.04	15.72	0.20	9.36
19	+0.51	5.40	0.02	0.04	27.92	0.24	3.47
20	1.67	4.22	0.02	0.04	40.11	0.28	357.36
21	+2.76	+2.77	+0.02	-0.04	52.30	-0.31	351.64
22	3.73	+1.16	0.02	0.04	64.48	0.35	346.75
23	4.51	-0.50	0.02	0.04	76.67	0.39	342.89
24	5.05	2.11	0.02	0.04	88.85	0.42	340.09
25	5.33	3.56	0.02	0.04	101.03	0.45	338.33
26	+5.31	-4.79	+0.02	-0.04	113.21	-0.48	337.57
27	4.99	5.75	0.02	0.04	125.39	0.51	337.78
28	4.38	6.41	0.02	0.04	137.58	0.54	338.95
29	3.52	6.76	0.02	0.04	149.78	0.56	341.08
30	2.46	6.80	0.02	0.04	161.98	0.58	344.15
31	+1.26	-6.55	+0.02	-0.04	174.18	-0.59	348.05
1	-0.02	6.02	0.02	0.04	186.39	0.61	352.63
2	1.29	5.23	0.02	0.04	198.61	0.62	357.63
3	2.49	4.21	0.02	0.04	210.83	0.64	2.74
4	3.53	2.99	0.02	0.04	223.05	0.65	7.64
5	-4.35	-1.61	+0.02	-0.04	235.28	-0.67	12.07
6	4.90	-0.13	0.02	0.04	247.51	0.68	15.84
7	5.14	+1.40	0.02	0.04	259.75	0.70	18.85
8	5.04	2.88	0.02	0.03	271.98	0.72	21.01
9	4.62	4.23	0.02	0.03	284.22	0.74	22.22
10	-3.91	+5.36	+0.02	-0.03	296.45	-0.76	22.40
11	2.98	6.18	0.02	0.03	308.68	0.79	21.40
12	1.90	6.62	0.02	0.03	320.91	0.81	19.11
13	-0.75	6.66	0.02	0.03	333.13	0.84	15.48
14	+0.39	6.28	0.02	0.03	345.34	0.87	10.62
15	+1.46	+5.51	+0.02	-0.03	357.55	-0.89	4.89
16	2.42	4.42	0.02	0.03	9.75	0.92	358.86
17	3.24	3.06	0.02	0.03	21.94	0.96	353.11
18	3.91	+1.53	0.02	0.03	34.12	0.99	348.07
19	4.43	-0.07	0.02	0.03	46.30	1.02	343.97
20	+4.77	-1.65	+0.02	-0.03	58.47	-1.05	340.89
21	4.93	3.11	0.02	0.04	70.64	1.08	338.81
22	4.90	4.38	0.02	0.04	82.81	1.11	337.70
23	4.66	5.40	0.02	0.04	94.97	1.14	337.56
24	4.19	6.14	0.02	0.04	107.14	1.16	338.39
25	+3.49	-6.57	+0.02	-0.04	119.31	-1.18	340.20
26	2.58	6.69	0.02	0.04	131.48	1.20	342.97
27	1.49	6.51	0.02	0.04	143.66	1.21	346.63
28	+0.26	6.06	0.02	0.04	155.84	1.22	351.02
29	-1.05	5.34	0.02	0.04	168.03	1.23	355.90
30	-2.37	-4.40	+0.02	-0.04	180.22	-1.23	0.97
1	-3.61	-3.26	+0.02	-0.04	192.41	-1.24	5.92

EPHEMERIS FOR PHYSICAL OBSERVATIONS OF THE MOON.
FOR WASHINGTON MEAN MIDNIGHT.

Date.	The Earth's Selenographic—		Physical Libration.		The Sun's Selenographic—		C	
	Long.	Lat.	Long.	Lat.	Colong.	Lat.		
Oct.	1	−3.61	−3.26	+0.02	−0.04	192.41	−1.24	5.92
	2	4.67	1.96	0.02	0.04	204.61	1.25	10.49
	3	5.48	−0.54	0.02	0.04	216.82	1.25	14.49
	4	5.96	+0.94	0.02	0.03	229.03	1.26	17.78
	5	6.04	2.41	0.02	0.03	241.25	1.27	20.28
	6	−5.70	+3.79	+0.02	−0.03	253.46	−1.27	21.89
	7	4.93	4.98	0.02	0.03	265.68	1.28	22.49
	8	3.79	5.89	0.02	0.03	277.90	1.29	21.93
	9	2.38	6.43	0.02	0.03	290.12	1.30	20.04
	10	−0.83	6.55	0.02	0.03	302.34	1.31	16.73
	11	+0.73	+6.24	+0.02	−0.03	314.55	−1.33	12.06
	12	2.17	5.53	0.02	0.03	326.76	1.35	6.39
	13	3.39	4.47	0.02	0.03	338.96	1.37	0.28
	14	4.35	3.15	0.02	0.03	351.15	1.39	354.38
	15	5.03	1.66	0.02	0.03	3.33	1.41	349.16
	16	+5.45	+0.10	+0.02	−0.03	15.51	−1.43	344.86
	17	5.64	−1.44	0.02	0.03	27.68	1.45	341.57
	18	5.62	2.88	0.02	0.03	39.84	1.47	339.26
	19	5.42	4.14	0.02	0.03	52.00	1.49	337.90
	20	5.05	5.17	0.02	0.03	64.16	1.51	337.47
	21	+4.52	−5.94	+0.02	−0.03	76.31	−1.52	338.00
	22	3.82	6.41	0.02	0.04	88.46	1.53	339.49
	23	2.96	6.57	0.02	0.04	100.61	1.54	341.97
	24	1.94	6.44	0.02	0.04	112.76	1.55	345.37
	25	+0.77	6.03	0.02	0.04	124.92	1.55	349.56
	26	−0.52	−5.35	+0.02	−0.04	137.08	−1.55	354.32
	27	1.88	4.45	0.02	0.04	149.24	1.55	359.34
	28	3.24	3.36	0.02	0.04	161.40	1.54	4.32
	29	4.53	2.11	0.02	0.03	173.57	1.54	8.98
	30	5.65	−0.76	0.02	0.03	185.75	1.53	13.12
	31	−6.52	+0.66	+0.02	−0.03	197.93	−1.53	16.62
Nov.	1	7.05	2.08	0.02	0.03	210.12	1.52	19.39
	2	7.15	3.42	0.02	0.03	222.31	1.51	21.35
	3	6.74	4.63	0.02	0.03	234.50	1.51	22.39
	4	5.83	5.61	0.02	0.03	246.70	1.50	22.36
	5	−4.45	+6.26	+0.02	−0.03	258.91	−1.50	21.06
	6	2.72	6.50	0.02	0.03	271.11	1.49	18.31
	7	−0.78	6.29	0.02	0.03	283.32	1.49	14.06
	8	+1.18	5.64	0.02	0.03	295.52	1.49	8.53
	9	2.99	4.60	0.02	0.03	307.72	1.49	2.29
	10	+4.51	+3.27	+0.02	−0.03	319.91	−1.49	356.06
	11	5.66	1.76	0.02	0.03	332.10	1.50	350.46
	12	6.43	+0.17	0.02	0.03	344.28	1.50	345.83
	13	6.82	−1.38	0.02	0.03	356.45	1.50	342.25
	14	6.88	2.83	0.02	0.03	8.62	1.51	339.69
	15	+6.66	−4.09	+0.02	−0.03	20.78	−1.52	338.10
	16	+6.22	−5.13	+0.02	−0.03	32.93	−1.52	337.45

EPIHEMERIS FOR PHYSICAL OBSERVATIONS OF THE MOON.

FOR WASHINGTON MEAN MIDNIGHT.

ite.	The Earth's Selenographic—		Physical Libration.		The Sun's Selenographic—		C
	Long.	Lat.	Long.	Lat.	Colong.	Lat.	
	*	*	*	*	*	*	*
16	+6.22	-5.13	+0.02	-0.03	32.93	-1.52	337.45
17	5.59	5.90	0.02	0.03	45.08	1.53	337.73
18	4.80	6.39	0.02	0.03	57.22	1.53	338.96
19	3.87	6.58	0.02	0.03	69.36	1.53	341.16
20	2.82	6.46	0.02	0.03	81.50	1.52	344.30
21	+1.66	-6.06	+0.02	-0.03	93.64	-1.52	348.29
22	+0.40	5.40	0.02	0.03	105.77	1.51	352.92
23	-0.93	4.52	0.02	0.03	117.91	1.49	357.91
24	2.31	3.44	0.02	0.03	130.05	1.48	2.92
25	3.68	2.20	0.01	0.03	142.20	1.46	7.67
26	-4.98	-0.86	+0.01	-0.03	154.35	-1.44	11.94
27	6.13	+0.53	0.01	0.03	166.50	1.42	15.59
28	7.05	1.93	0.01	0.03	178.66	1.40	18.55
29	7.65	3.27	0.01	0.03	190.82	1.38	20.75
30	7.83	4.48	0.01	0.03	202.99	1.36	22.13
1	-7.53	+5.48	+0.01	-0.03	215.17	-1.34	22.56
2	6.71	6.20	0.01	0.03	227.35	1.32	21.86
3	5.39	6.56	0.01	0.03	239.54	1.30	19.82
4	3.64	6.49	0.01	0.03	251.73	1.28	16.27
5	-1.59	5.96	0.01	0.03	263.92	1.27	11.25
6	+0.56	+5.00	+0.01	-0.03	276.12	-1.25	5.14
7	2.63	3.68	0.01	0.03	288.31	1.23	358.65
8	4.44	2.12	0.01	0.03	300.50	1.22	352.54
9	5.88	+0.46	0.01	0.03	312.69	1.21	347.34
10	6.88	-1.19	0.01	0.03	324.87	1.20	343.26
11	+7.44	-2.73	+0.02	-0.03	337.04	-1.19	340.30
12	7.59	4.07	0.02	0.03	349.20	1.18	338.40
13	7.37	5.16	0.02	0.03	1.36	1.17	337.49
14	6.85	5.97	0.02	0.03	13.52	1.16	337.53
15	6.09	6.48	0.02	0.03	25.67	1.14	338.52
16	+5.14	-6.69	+0.01	-0.03	37.81	-1.13	340.48
17	4.05	6.60	0.01	0.03	49.95	1.12	343.38
18	2.85	6.22	0.01	0.03	62.08	1.11	347.16
19	1.57	5.58	0.01	0.03	74.21	1.09	351.65
20	+0.25	4.70	0.01	0.03	86.34	1.07	356.58
21	-1.10	-3.62	+0.01	-0.03	98.47	-1.05	1.63
22	2.44	2.37	0.01	0.03	110.60	1.02	6.49
23	3.73	-1.02	+0.01	0.03	122.73	0.99	10.91
24	4.94	+0.39	0.00	0.03	134.87	0.96	14.72
25	6.01	1.80	0.00	0.03	147.01	0.93	17.85
26	-6.86	+3.15	0.00	-0.03	159.15	-0.90	20.24
27	7.44	4.38	0.00	0.03	171.30	0.87	21.84
28	7.67	5.42	0.00	0.03	183.45	0.84	22.57
29	7.49	6.20	0.00	0.03	195.61	0.81	22.30
30	6.86	6.64	0.00	0.03	207.78	0.78	20.84
31	-5.78	+6.71	0.00	-0.03	219.95	-0.75	18.04
32	-4.28	+6.34	0.00	-0.03	232.13	-0.72	13.74

620 ILLUMINATED DISK OF MERCURY, 1915.

FOR WASHINGTON MEAN NOON.

Date.	<i>k</i>	<i>i</i>	θ	<i>L</i>	Stellar Mag.	Date.	<i>k</i>	<i>i</i>	θ	<i>L</i>	Stellar Mag.
Jan. 1	0.997	6	142	25.1	-0.8	July 5	0.073	149	159	10.7	+2.1
6	0.999	4	65	26.9	0.9	10	0.102	133	167	22.2	1.5
11	0.993	10	19	30.1	0.9	15	0.279	116	172	34.0	0.0
16	0.975	18	3	35.2	0.9	20	0.423	99	177	46.0	+0.3
21	0.939	29	354	42.9	0.9	25	0.588	80	183	57.8	-0.3
26	0.868	43	347	53.3	-0.9	30	0.758	59	190	66.7	-0.8
31	0.744	61	342	64.3	0.7	Aug. 4	0.898	37	198	68.4	1.1
5	0.553	84	337	68.2	-0.4	9	0.979	17	213	62.0	1.5
10	0.317	111	332	53.6	+0.4	14	0.998	5	299	52.0	1.6
15	0.110	141	324	23.0	1.4	19	0.982	16	4	43.0	1.2
20	0.012	168	280	2.6	+2.7	24	0.949	26	15	36.4	-0.8
25	0.043	156	183	8.5	2.2	29	0.910	35	20	32.0	0.5
Mar. 2	0.154	134	109	23.6	1.4	Sept. 3	0.869	42	22	29.5	0.3
7	0.280	116	164	32.3	0.9	8	0.826	49	24	28.3	-0.1
12	0.393	102	161	34.5	0.7	13	0.780	56	25	28.4	+0.1
17	0.488	91	158	33.8	+0.5	18	0.727	63	26	29.4	+0.1
22	0.566	82	156	32.6	0.4	23	0.665	71	26	31.5	0.2
27	0.633	75	154	31.6	0.3	28	0.586	80	27	34.4	0.3
Apr. 1	0.692	67	152	31.5	+0.1	Oct. 3	0.486	92	27	37.4	0.4
6	0.751	60	151	32.4	0.0	8	0.356	107	28	37.8	0.7
11	0.808	52	150	34.7	-0.2	13	0.199	127	30	30.1	+1.1
16	0.867	43	149	38.8	0.5	18	0.051	154	35	10.5	2.0
21	0.926	32	149	45.1	0.9	23	0.005	172	185	1.2	2.8
26	0.977	18	149	53.6	1.4	28	0.133	137	206	28.1	1.2
May 1	1.000	1	89	62.7	1.9	Nov. 2	0.369	105	208	57.0	+0.2
6	0.971	20	338	68.4	-1.6	7	0.594	79	208	62.0	-0.4
11	0.879	41	341	66.6	1.2	12	0.756	59	207	53.6	0.0
16	0.749	60	345	59.0	0.7	17	0.859	44	205	43.7	0.0
21	0.613	77	349	50.0	-0.2	22	0.920	33	202	35.9	0.7
26	0.487	91	353	42.2	+0.3	27	0.958	24	198	30.5	0.7
31	0.374	105	357	35.5	+0.7	Dec. 2	0.980	16	192	27.1	-0.7
5	0.273	117	0	29.3	1.1	7	0.993	10	182	25.1	0.7
10	0.180	130	4	22.2	1.5	12	0.999	4	157	24.4	0.8
15	0.090	143	9	14.0	1.9	17	0.999	4	59	24.7	0.8
20	0.038	158	19	5.9	2.5	22	0.994	9	24	26.2	0.8
25	0.008	170	62	1.3	+3.1	27	0.981	16	12	29.1	-0.8
30	0.019	164	140	3.2	+2.8	32	0.957	24	4	33.7	-0.8

NOTATION.

k=the ratio of the area of the illuminated portion of the apparent disk to the area of the entire apparent disk regarded as circular.

i=the angle between the Sun and Earth, as seen from the planet.

θ =the angle which the line joining the cusps, or extremities of the illuminated portion, makes with the meridian.

L=the brilliancy of the disk. The unit of *L* is the amount of light received by an eye from a circular disk with the same albedo as the planet, subtending an angular radius of one second of arc, situated at distance unity from the Sun, and illuminated by the latter as the mean disk of the planet is illuminated.

The magnitudes of the planet have been computed from formulæ given in the Potsdam Observations, vol. 8, page 366.

FOR WASHINGTON MEAN NOON.

etc.	<i>k</i>	<i>i</i>	θ	<i>L</i>	Stellar Mag.	Date.	<i>k</i>	<i>i</i>	θ	<i>L</i>	Stellar Mag.
		°	°					°	°		
1	0.255	119.3	196.8	218.9	-4.4	July 5	0.946	26.8	175.9	51.3	-3.3
6	0.297	113.9	195.6	216.8	4.4	10	0.954	24.8	179.1	50.7	3.3
11	0.336	109.2	194.1	209.8	4.3	15	0.961	22.9	182.4	50.2	3.3
16	0.372	104.9	192.4	200.2	4.3	20	0.967	21.0	185.8	49.7	3.3
21	0.406	100.9	190.5	189.6	4.2	25	0.973	19.0	189.2	49.3	3.4
26	0.437	97.3	188.4	178.7	-4.2	30	0.978	17.0	192.7	48.9	-3.4
31	0.466	93.9	186.1	168.0	4.1	Aug. 4	0.983	15.1	196.3	48.6	3.4
5	0.493	90.8	183.8	157.7	4.1	9	0.987	13.2	200.0	48.3	3.4
10	0.519	87.8	181.3	148.1	4.0	14	0.990	11.3	203.9	48.1	3.4
15	0.544	85.0	178.8	139.1	4.0	19	0.993	9.4	208.2	47.9	3.4
20	0.567	82.4	176.2	130.9	-3.9	24	0.996	7.5	213.3	47.7	-3.4
25	0.589	79.8	173.7	123.3	3.9	29	0.998	5.7	220.0	47.6	3.5
2	0.610	77.3	171.2	116.4	3.8	Sept. 3	0.999	4.0	231.4	47.5	3.5
7	0.630	74.9	168.8	110.1	3.8	8	1.000	2.5	254.9	47.4	3.5
12	0.649	72.6	166.5	104.4	3.7	13	1.000	2.0	303.5	47.4	3.5
17	0.668	70.4	164.3	99.2	-3.7	18	0.999	3.0	342.6	47.4	-3.5
22	0.686	68.2	162.3	94.4	3.7	23	0.999	4.5	359.1	47.5	3.5
27	0.703	66.1	160.5	90.0	3.6	28	0.997	6.2	6.9	47.6	3.5
1	0.719	64.0	158.9	86.0	3.6	Oct. 3	0.995	7.9	11.1	47.7	3.4
6	0.735	61.9	157.5	82.4	3.5	8	0.993	9.7	13.6	47.9	3.4
11	0.751	59.9	156.4	79.0	-3.5	13	0.990	11.4	15.0	48.1	-3.4
16	0.766	57.9	155.5	75.9	3.5	18	0.987	13.1	15.6	48.3	3.4
21	0.780	55.9	154.8	73.2	3.5	23	0.983	14.9	15.6	48.6	3.4
26	0.794	53.9	154.4	70.6	3.4	28	0.979	16.6	15.1	49.0	3.4
1	0.808	52.0	154.3	68.2	3.4	Nov. 2	0.975	18.3	14.2	49.4	3.4
6	0.821	50.1	154.4	66.1	-3.4	7	0.970	20.0	13.0	49.8	-3.4
11	0.834	48.1	154.8	64.1	3.4	12	0.965	21.6	11.4	50.3	3.3
16	0.846	46.2	155.5	62.3	3.4	17	0.959	23.3	9.6	50.9	3.3
21	0.858	44.3	156.4	60.7	3.3	22	0.953	25.0	7.5	51.5	3.3
26	0.870	42.3	157.6	59.2	3.3	27	0.947	26.6	5.3	52.2	3.3
31	0.881	40.4	159.0	57.9	-3.3	Dec. 2	0.940	28.3	2.9	52.9	-3.3
5	0.892	38.5	160.7	56.6	3.3	7	0.933	30.0	0.4	53.8	3.3
10	0.902	36.5	162.7	55.5	3.3	12	0.926	31.6	357.9	54.7	3.3
15	0.912	34.6	164.9	54.5	3.3	17	0.918	33.3	355.4	55.7	3.3
20	0.921	32.7	167.3	53.6	3.3	22	0.910	35.0	353.0	56.8	3.3
25	0.930	30.7	170.0	52.8	-3.3	27	0.901	36.7	350.6	57.9	-3.4
30	0.938	28.8	172.9	52.0	-3.3	32	0.892	38.4	348.4	59.1	-3.4

NOTATION.

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i=the angle between the Sun and Earth, as seen from the planet.

θ =the angle which the line joining the cusps, or extremities of the illuminated portion, makes with the meridian.

L=the brilliancy of the disk. The unit of *L* is the amount of light received by an eye from a circular disk with the same albedo as the planet, subtending an angular radius of one second of arc, situated at distance unity from the Sun, and illuminated by the latter as the mean disk of the planet is illuminated.

The magnitudes of the planet have been computed from formulæ given in the *Potsdam Observations*, vol. 8, page 366.

EPHEMERIS FOR PHYSICAL OBSERVATIONS OF MARS.

WASHINGTON MEAN TIME.

Noon.	Light-Time.	Stellar Magnitude.	P	$A_{\oplus} + 180^{\circ}$	D_{\oplus}	$A_{\odot} - A_{\oplus}$	D_{\odot}	Δ
	m		"	"	"	"	"	"
July 1	16.75	+1.4	324.02	150.93	-11.43	-28.03	-20.48	300.60
3	16.69	1.4	324.24	152.28	10.90	28.15	20.21	301.76
5	16.63	1.4	324.48	153.62	10.37	28.27	19.94	302.05
7	16.57	1.4	324.75	154.95	9.83	28.38	19.66	304.11
9	16.51	1.4	325.03	156.27	9.29	28.50	19.37	305.30
11	16.45	+1.4	325.34	157.58	-8.75	-28.61	-19.08	306.46
13	16.39	1.4	325.66	158.88	8.20	28.73	18.78	307.61
15	16.33	1.4	326.01	160.18	7.65	28.85	18.47	308.78
17	16.27	1.4	326.38	161.47	7.10	28.96	18.15	309.94
19	16.20	1.4	326.77	162.75	6.55	29.08	17.83	311.09
21	16.14	+1.4	327.17	164.02	-6.00	-29.20	-17.51	312.24
23	16.07	1.4	327.59	165.29	5.45	29.32	17.18	313.38
25	16.00	1.4	328.03	166.55	4.89	29.44	16.84	314.52
27	15.93	1.4	328.49	167.80	4.34	29.56	16.50	315.66
29	15.86	1.4	328.96	169.04	3.79	29.68	16.15	316.79
31	15.79	+1.4	329.45	170.28	-3.24	-29.81	-15.80	317.92
Aug. 2	15.72	1.4	329.95	171.52	2.68	29.93	15.45	319.04
4	15.64	1.4	330.47	172.75	2.13	30.06	15.09	320.16
6	15.57	1.4	331.00	173.97	1.58	30.19	14.72	321.28
8	15.49	1.4	331.54	175.19	1.03	30.32	14.35	322.39
10	15.41	+1.4	332.09	176.40	-0.49	-30.46	-13.98	323.50
12	15.33	1.4	332.66	177.61	+0.05	30.59	13.61	324.61
14	15.25	1.4	333.24	178.81	0.59	30.73	13.24	325.71
16	15.17	1.4	333.83	180.01	1.13	30.87	12.86	326.81
18	15.09	1.4	334.43	181.20	1.66	31.01	12.47	327.90
20	15.00	+1.4	335.04	182.38	+2.19	-31.15	-12.08	328.99
22	14.92	1.4	335.65	183.56	2.71	31.30	11.69	330.08
24	14.83	1.4	336.27	184.74	3.23	31.44	11.30	331.16
26	14.74	1.3	336.91	185.92	3.75	31.60	10.91	332.24
28	14.65	1.3	337.55	187.09	4.26	31.75	10.51	333.32
30	14.56	+1.3	338.20	188.25	+4.76	-31.90	-10.11	334.39
Sept. 1	14.46	1.3	338.85	189.41	5.26	32.06	9.72	335.46
3	14.37	1.3	339.51	190.57	5.76	32.22	9.32	336.52
5	14.27	1.3	340.17	191.73	6.25	32.38	8.92	337.58
7	14.17	1.3	340.84	192.88	6.74	32.54	8.51	338.64
9	14.07	+1.3	341.51	194.02	+7.22	-32.70	-8.11	339.69
11	13.97	1.3	342.18	195.16	7.69	32.86	7.70	340.74
13	13.87	1.3	342.85	196.30	8.15	33.03	7.30	341.79
15	13.77	1.3	343.53	197.43	8.61	33.19	6.89	342.85
17	13.66	1.2	344.21	198.56	9.06	33.36	6.48	343.91
19	13.56	+1.2	344.89	199.68	+9.51	-33.52	-6.07	344.95
21	13.45	1.2	345.57	200.80	9.95	33.69	5.66	345.99
23	13.34	1.2	346.26	201.92	10.38	33.86	5.25	347.04
25	13.23	1.2	346.94	203.03	10.80	34.02	4.85	348.09
27	13.12	1.2	347.62	204.14	11.21	34.19	4.44	349.02
29	13.00	+1.2	348.30	205.24	+11.61	-34.36	-4.03	350.05
Oct. 1	12.89	+1.2	348.97	206.33	+12.01	-34.52	-3.62	351.05

EPHEMERIS FOR PHYSICAL OBSERVATIONS OF MARS.

WASHINGTON MEAN TIME.

Moon.	k	Diameter.	i	q	Q	Central Meridian.	Transit of Zero Meridian.	
							Of Date.	Of Intermediate Date.
		"	"	"	"	"	h m	h m
y	1	0.940	5.01	28.37	0.30	256.15	9.33	0 1.8
	3	0.939	5.03	28.61	0.31	256.68	349.78	0 42.0
	5	0.938	5.05	28.86	0.31	257.21	330.24	2 2.4
	7	0.937	5.06	29.10	0.32	257.75	310.71	3 22.7
	9	0.936	5.08	29.34	0.33	258.29	291.19	4 42.9
	11	0.935	5.10	29.58	0.33	258.85	271.68	6 3.1
	13	0.934	5.12	29.82	0.34	259.41	252.17	7 23.3
	15	0.933	5.14	30.05	0.34	259.97	232.67	8 43.5
	17	0.932	5.16	30.29	0.35	260.54	213.18	10 3.6
	19	0.931	5.18	30.52	0.36	261.11	193.70	11 23.7
	21	0.930	5.20	30.75	0.37	261.69	174.23	12 43.7
	23	0.929	5.22	30.99	0.37	262.27	154.77	14 3.7
	25	0.928	5.24	31.22	0.38	262.86	135.31	15 23.7
	27	0.927	5.26	31.45	0.39	263.44	115.86	16 43.7
	29	0.926	5.29	31.68	0.39	264.03	96.41	18 3.6
	31	0.924	5.31	31.90	0.40	264.62	76.97	19 23.5
g.	2	0.923	5.34	32.13	0.41	265.21	57.54	20 43.4
	4	0.922	5.36	32.35	0.42	265.80	38.11	22 3.2
	6	0.921	5.39	32.58	0.42	266.40	18.69	23 23.1
	8	0.920	5.41	32.80	0.43	266.99	359.28	0 3.0
	10	0.919	5.44	33.02	0.44	267.59	339.87	1 22.8
	12	0.918	5.47	33.24	0.45	268.18	320.47	2 42.5
	14	0.917	5.50	33.45	0.46	268.76	301.07	4 2.3
	16	0.916	5.53	33.66	0.46	269.35	281.68	5 22.0
	18	0.915	5.56	33.87	0.47	269.94	262.29	6 41.7
	20	0.914	5.59	34.08	0.48	270.52	242.91	8 1.3
	22	0.913	5.63	34.29	0.49	271.10	223.53	9 21.0
	24	0.912	5.66	34.49	0.50	271.67	204.16	10 40.6
	26	0.911	5.69	34.69	0.51	272.25	184.79	12 0.2
	28	0.910	5.72	34.89	0.52	272.81	165.42	13 19.8
	30	0.909	5.76	35.09	0.52	273.37	146.06	14 39.4
it.	1	0.908	5.80	35.28	0.53	273.92	126.71	15 58.9
	3	0.907	5.84	35.47	0.54	274.47	107.36	17 18.5
	5	0.906	5.88	35.66	0.55	275.02	88.01	18 38.0
	7	0.905	5.92	35.84	0.56	275.55	68.67	19 57.5
	9	0.905	5.97	36.02	0.57	276.08	49.33	21 17.0
	11	0.904	6.01	36.20	0.58	276.60	30.00	22 36.4
	13	0.903	6.05	36.37	0.59	277.12	10.67	23 55.8
	15	0.902	6.10	36.54	0.60	277.63	351.35	0 35.6
	17	0.901	6.14	36.70	0.61	278.13	332.03	1 55.0
	19	0.900	6.19	36.86	0.62	278.62	312.72	3 14.4
	21	0.899	6.24	37.02	0.63	279.10	293.41	4 33.7
	23	0.898	6.29	37.17	0.64	279.57	274.10	5 53.1
	25	0.898	6.34	37.31	0.65	280.03	254.80	7 12.4
	27	0.897	6.40	37.45	0.66	280.49	235.51	8 31.7
	29	0.896	6.45	37.58	0.67	280.93	216.22	9 51.0
t.	1	0.896	6.51	37.71	0.68	281.36	196.94	11 10.2

EPHEMERIS FOR PHYSICAL OBSERVATIONS OF MARS.

WASHINGTON MEAN TIME.

Noon.	Light-Time.	Stellar Magnitude.	<i>P</i>	$A_{\oplus} + 180^{\circ}$	D_{\oplus}	$A_{\odot} - A_{\oplus}$	D_{\odot}	\odot_{δ}
	m	.	.	.	.	.	.	.
Oct. 1	12.89	+1.2	348.97	206.33	+12.01	-34.52	- 3.62	351.05
3	12.77	1.1	349.65	207.42	12.40	34.68	3.21	352.06
5	12.65	1.1	350.32	208.51	12.78	34.84	2.81	353.07
7	12.53	1.1	350.99	209.59	13.15	35.00	2.40	354.08
9	12.41	1.1	351.66	210.66	13.51	35.16	2.00	355.08
11	12.29	+1.1	352.32	211.72	+13.86	-35.31	- 1.59	356.08
13	12.17	1.1	352.97	212.78	14.20	35.46	1.19	357.07
15	12.04	1.1	353.62	213.83	14.53	35.60	0.78	358.06
17	11.92	1.0	354.27	214.87	14.86	35.73	- 0.38	359.05
19	11.79	1.0	354.92	215.90	15.18	35.86	+ 0.02	0.04
21	11.66	+1.0	355.55	216.92	+15.48	-35.99	+ 0.42	1.02
23	11.53	1.0	356.17	217.93	15.77	36.11	0.82	2.00
25	11.40	1.0	356.79	218.94	16.05	36.22	1.21	2.98
27	11.27	0.9	357.40	219.94	16.32	36.32	1.61	3.96
29	11.14	0.9	358.01	220.92	16.58	36.41	2.00	4.93
31	11.01	+0.9	358.61	221.89	+16.83	-36.50	+ 2.40	5.90
Nov. 2	10.87	0.9	359.19	222.84	17.08	36.57	2.79	6.86
4	10.74	0.8	359.77	223.79	17.31	36.63	3.18	7.83
6	10.60	0.8	0.34	224.72	17.53	36.68	3.56	8.79
8	10.47	0.8	0.90	225.63	17.74	36.71	3.95	9.75
10	10.33	+0.7	1.44	226.53	+17.94	-36.73	+ 4.33	10.70
12	10.19	0.7	1.97	227.41	18.13	36.74	4.71	11.65
14	10.05	0.7	2.49	228.27	18.30	36.72	5.09	12.60
16	9.91	0.7	3.00	229.11	18.46	36.69	5.47	13.55
18	9.78	0.6	3.49	229.93	18.62	36.64	5.84	14.40
20	9.64	+0.6	3.97	230.73	+18.77	-36.57	+ 6.21	15.44
22	9.50	0.6	4.44	231.51	18.90	36.48	6.58	16.38
24	9.36	0.5	4.89	232.26	19.02	36.37	6.95	17.31
26	9.22	0.5	5.32	233.00	19.13	36.23	7.31	18.25
28	9.08	0.5	5.74	233.71	19.24	36.07	7.67	19.19
30	8.94	+0.4	6.14	234.38	+19.33	-35.88	+ 8.03	20.12
Dec. 2	8.80	0.4	6.52	235.03	19.41	35.66	8.39	21.04
4	8.66	0.4	6.88	235.65	19.48	35.41	8.75	21.97
6	8.52	0.3	7.22	236.23	19.54	35.13	9.10	22.90
8	8.38	0.3	7.54	236.78	19.58	34.82	9.45	23.82
10	8.25	+0.3	7.84	237.30	+19.62	-34.47	+ 9.79	24.74
12	8.11	0.2	8.12	237.78	19.65	34.08	10.14	25.66
14	7.98	0.2	8.38	238.22	19.66	33.65	10.48	26.58
16	7.84	0.1	8.61	238.62	19.67	33.19	10.81	27.49
18	7.71	+0.1	8.82	238.97	19.66	32.68	11.15	28.41
20	7.58	0.0	9.01	239.29	+19.65	-32.13	+11.48	29.32
22	7.46	0.0	9.17	239.56	19.62	31.54	11.81	30.22
24	7.33	0.0	9.30	239.79	19.59	30.89	12.13	31.13
26	7.21	-0.1	9.40	239.97	19.55	30.20	12.45	32.04
28	7.08	0.1	9.48	240.09	19.49	29.46	12.77	32.94
30	6.97	-0.2	9.53	240.16	+19.42	-28.67	+13.08	33.84
32	6.85	-0.2	9.54	240.18	+19.35	-27.82	+13.39	34.74

EPHEMERIS FOR PHYSICAL OBSERVATIONS OF MARS.

WASHINGTON MEAN TIME.

JUL.	k	Diameter.	i	q	Q	Central Meridian.	Transit of Zero Meridian.	
							Of Date.	Of Intermediate Date.
		"	"	"	"	"	h m	h m
1	0.896	6.51	37.71	0.68	281.36	196.94	11 10.2	11 49.8
3	0.895	6.57	37.83	0.69	281.78	177.66	12 29.4	13 9.0
5	0.894	6.63	37.95	0.70	282.20	158.39	13 48.6	14 28.2
7	0.894	6.69	38.06	0.71	282.60	139.12	15 7.8	15 47.4
9	0.893	6.76	38.16	0.72	282.99	119.86	16 27.0	17 6.5
11	0.893	6.83	38.25	0.73	283.37	100.61	17 46.0	18 25.6
13	0.892	6.90	38.34	0.74	283.74	81.37	19 5.1	19 44.6
15	0.892	6.97	38.41	0.75	284.10	62.14	20 24.2	21 3.7
17	0.891	7.04	38.48	0.76	284.45	42.91	21 43.2	22 22.6
19	0.891	7.12	38.53	0.77	284.79	23.69	23 2.1	23 41.6
21	0.891	7.20	38.58	0.78	285.12	4.48	...	0 21.0
23	0.891	7.28	38.62	0.80	285.43	345.28	1 0.5	1 39.9
25	0.890	7.36	38.65	0.81	285.73	326.10	2 19.3	2 58.7
27	0.890	7.45	38.66	0.82	286.02	306.92	3 38.1	4 17.5
29	0.890	7.54	38.67	0.82	286.30	287.75	4 56.9	5 36.2
31	0.890	7.63	38.66	0.83	286.57	268.60	6 15.6	6 54.9
2	0.891	7.72	38.64	0.84	286.83	249.46	7 34.2	8 13.5
4	0.891	7.81	38.61	0.85	287.07	230.33	8 52.8	9 32.1
6	0.891	7.91	38.56	0.86	287.30	211.22	10 11.3	10 50.6
8	0.891	8.01	38.49	0.88	287.52	192.13	11 29.8	12 9.0
10	0.892	8.12	38.41	0.89	287.73	173.05	12 48.2	13 27.3
12	0.892	8.23	38.31	0.90	287.92	153.98	14 6.5	14 45.6
14	0.893	8.35	38.20	0.90	288.11	134.94	15 24.7	16 3.8
16	0.894	8.47	38.07	0.91	288.28	115.92	16 42.8	17 21.9
18	0.895	8.59	37.92	0.91	288.44	96.91	18 0.9	18 39.9
20	0.895	8.71	37.75	0.92	288.58	77.93	19 18.8	19 57.8
22	0.896	8.84	37.55	0.92	288.71	58.97	20 36.7	21 15.6
24	0.897	8.97	37.34	0.92	288.83	40.03	21 54.4	22 33.3
26	0.899	9.10	37.10	0.92	288.93	21.12	23 12.1	23 50.8
28	0.900	9.24	36.84	0.92	289.02	2.23	...	0 29.6
30	0.902	9.39	36.55	0.92	289.10	343.37	1 8.3	1 47.0
2	0.903	9.54	36.23	0.92	289.16	324.54	2 25.6	3 4.2
4	0.905	9.69	35.89	0.92	289.21	305.74	3 42.8	4 21.4
6	0.907	9.85	35.52	0.92	289.24	286.97	4 59.9	5 38.4
8	0.909	10.01	35.11	0.91	289.26	268.24	6 16.8	6 55.2
10	0.911	10.18	34.67	0.90	289.26	249.54	7 33.6	8 11.9
12	0.914	10.35	34.20	0.89	289.24	230.88	8 50.2	9 28.4
14	0.916	10.52	33.70	0.88	289.20	212.26	10 6.6	10 44.8
16	0.919	10.70	33.16	0.87	289.15	193.67	11 22.9	12 1.0
18	0.921	10.88	32.57	0.86	289.08	175.13	12 39.0	13 17.0
20	0.924	11.07	31.95	0.84	288.98	156.63	13 54.9	14 32.8
22	0.927	11.26	31.29	0.82	288.86	138.17	15 10.6	15 48.4
24	0.931	11.45	30.59	0.80	288.72	119.76	16 26.1	17 3.8
26	0.934	11.65	29.84	0.77	288.56	101.40	17 41.4	18 19.0
28	0.937	11.85	29.04	0.74	288.36	83.09	18 56.5	19 33.9
30	0.941	12.05	28.20	0.71	288.14	64.83	20 11.3	20 48.7
32	0.944	12.25	27.31	0.68	287.88	46.62	21 26.0	22 3.2

EPHEMERIS FOR PHYSICAL OBSERVATIONS OF JUPITER.

WASHINGTON MEAN TIME.

Noon.		Light- Time.	Stellar Magni- tude.	<i>P</i>	$A_{\oplus} + 180^{\circ}$	D_{\oplus}	$A_{\odot} + 180^{\circ}$	D_{\odot}
		m		.	.	.	.	.
Jan.	1	47.34	-1.7	338.84	186.84	+0.36	194.42	+0.76
	8	47.91	1.6	338.48	188.33	0.42	195.04	0.80
	15	48.42	1.6	338.13	189.86	0.47	195.67	0.83
	22	48.86	1.6	337.79	191.45	0.53	196.30	0.86
	29	49.20	-1.6	337.45	193.07	+0.59	196.92	+0.89
Mar.	27	48.97	-1.6	335.35	206.63	+1.16	202.04	+1.15
Apr.	3	48.57	1.6	335.19	208.23	1.23	202.67	1.18
	10	48.09	1.6	335.05	209.79	1.30	203.30	1.22
	17	47.55	1.7	334.93	211.30	1.38	203.93	1.25
	24	46.94	1.7	334.83	212.75	1.45	204.56	1.28
May	1	46.28	-1.7	334.75	214.14	+1.52	205.19	+1.31
	8	45.56	1.7	334.68	215.46	1.59	205.82	1.34
	15	44.79	1.8	334.63	216.70	1.66	206.45	1.37
	22	43.98	1.8	334.60	217.86	1.73	207.09	1.40
	29	43.13	1.9	334.57	218.92	1.79	207.72	1.43
June	5	42.26	-1.9	334.55	219.86	+1.86	208.35	+1.46
	12	41.37	2.0	334.54	220.69	1.92	208.99	1.49
	19	40.47	2.0	334.54	221.39	1.97	209.62	1.52
	26	39.57	2.1	334.54	221.96	2.03	210.26	1.55
July	3	38.68	2.1	334.54	222.39	2.08	210.89	1.58
	10	37.82	-2.2	334.54	222.67	+2.12	211.52	+1.61
	17	36.99	2.2	334.54	222.78	2.16	212.16	1.64
	24	36.20	2.3	334.54	222.74	2.19	212.80	1.66
	31	35.47	2.3	334.54	222.54	2.22	213.43	1.69
Aug.	7	34.82	2.3	334.54	222.19	2.24	214.06	1.72
	14	34.24	-2.4	334.54	221.68	+2.25	214.70	+1.75
	21	33.75	2.4	334.54	221.04	2.26	215.34	1.78
	28	33.37	2.4	334.54	220.28	2.25	215.98	1.80
Sept.	4	33.10	2.5	334.55	219.44	2.24	216.61	1.83
	11	32.95	2.5	334.57	218.54	2.22	217.25	1.86
	18	32.92	-2.5	334.59	217.61	+2.20	217.89	+1.89
	25	33.01	2.5	334.62	216.68	2.16	218.53	1.91
Oct.	2	33.22	2.4	334.65	215.80	2.12	219.16	1.94
	9	33.55	2.4	334.68	214.99	2.08	219.80	1.97
	16	34.00	2.4	334.72	214.28	2.04	220.44	1.99
	23	34.54	-2.4	334.75	213.70	+2.00	221.08	+2.02
	30	35.17	2.3	334.78	213.27	1.96	221.72	2.04
Nov.	6	35.89	2.3	334.79	212.99	1.92	222.36	2.07
	13	36.67	2.2	334.80	212.88	1.89	222.99	2.09
	20	37.50	2.2	334.80	212.94	1.86	223.63	2.12
	27	38.38	-2.1	334.79	213.17	+1.84	224.27	+2.14
Dec.	4	39.28	2.1	334.77	213.56	1.83	224.91	2.17
	11	40.20	2.0	334.74	214.10	1.82	225.55	2.19
	18	41.12	2.0	334.70	214.79	1.82	226.19	2.22
	25	42.03	-1.9	334.67	215.62	1.82	226.83	2.24
	32	42.92	-1.9	334.63	216.58	+1.83	227.47	+2.26

PHEMERIS FOR PHYSICAL OBSERVATIONS OF JUPITER.

WASHINGTON MEAN TIME.

n.	Equatorial Diameter.	Excess of Equat. Diameter over Polar.	i	q	Q	Central Meridian.		Correction for Phase.
						System I.	System II.	
	"	"	°	"	°	°	°	°
1	35.18	2.13	7.59	0.15	71.89	37.30	13.15	-0.25
8	34.75	2.11	6.73	0.12	71.77	60.76	343.21	0.20
15	34.39	2.09	5.82	0.09	71.71	84.22	313.25	0.15
22	34.09	2.07	4.86	0.06	71.74	107.66	283.30	0.10
29	33.84	2.05	3.87	0.04	71.98	131.14	253.36	-0.07
27	34.01	2.06	4.60	0.05	245.35	118.01	165.32	+0.09
3	34.29	2.08	5.56	0.08	245.61	141.96	135.86	0.14
10	34.62	2.10	6.49	0.11	245.76	165.99	106.48	0.18
17	35.02	2.12	7.37	0.14	245.86	190.11	77.18	0.24
24	35.47	2.15	8.21	0.18	245.93	214.32	47.98	0.29
1	35.98	2.18	8.96	0.22	246.00	238.63	18.89	+0.35
8	36.55	2.22	9.64	0.26	246.05	263.05	349.89	0.41
15	37.18	2.26	10.26	0.30	246.12	287.58	321.01	0.46
22	37.87	2.30	10.78	0.33	246.19	312.22	292.23	0.51
29	38.61	2.34	11.20	0.37	246.27	336.98	263.58	0.55
5	39.41	2.39	11.51	0.40	246.36	1.87	235.05	+0.58
12	40.26	2.44	11.71	0.42	246.46	26.88	206.65	0.60
19	41.15	2.49	11.78	0.43	246.56	52.03	178.38	0.61
26	42.08	2.55	11.71	0.44	246.69	77.31	150.24	0.60
3	43.05	2.61	11.50	0.43	246.83	102.72	122.24	0.58
10	44.03	2.67	11.15	0.42	247.00	128.27	94.38	+0.54
17	45.02	2.73	10.63	0.39	247.20	153.96	66.66	0.49
24	46.00	2.79	9.95	0.35	247.42	179.79	39.06	0.43
31	46.94	2.84	9.12	0.30	247.70	205.73	11.59	0.36
7	47.83	2.90	8.13	0.24	248.07	231.79	344.24	0.29
14	48.64	2.95	6.99	0.18	248.55	257.95	316.98	+0.21
21	49.33	2.99	5.72	0.12	249.26	284.18	289.80	0.14
28	49.89	3.02	4.33	0.07	250.42	310.46	262.68	0.08
4	50.30	3.05	2.86	0.03	252.76	336.77	235.57	0.04
11	50.54	3.06	1.34	0.01	260.28	3.07	208.46	+0.01
18	50.59	3.06	0.42	0.00	17.21	29.32	181.30	0.00
25	50.44	3.06	1.86	0.01	56.96	55.49	154.06	-0.02
2	50.12	3.04	3.37	0.04	61.57	81.54	126.70	0.05
9	49.63	3.01	4.81	0.09	63.37	107.45	99.20	0.10
16	48.98	2.97	6.15	0.14	64.36	133.18	71.53	0.17
23	48.21	2.92	7.37	0.20	65.03	158.73	43.67	-0.24
30	47.34	2.87	8.44	0.26	65.49	184.08	15.61	0.31
6	46.40	2.81	9.36	0.31	65.86	209.22	347.35	0.38
13	45.41	2.75	10.11	0.35	66.13	234.16	318.88	0.45
20	44.40	2.69	10.69	0.39	66.36	258.89	290.20	0.50
27	43.39	2.63	11.10	0.41	66.54	283.43	261.34	-0.54
4	42.40	2.57	11.36	0.42	66.68	307.79	232.30	0.56
11	41.43	2.51	11.45	0.41	66.81	331.99	203.09	0.57
18	40.50	2.45	11.40	0.40	66.91	356.04	173.73	0.57
25	39.63	2.40	11.21	0.38	67.01	19.95	144.24	0.55
32	38.80	2.35	10.90	0.35	67.10	43.75	114.63	-0.52

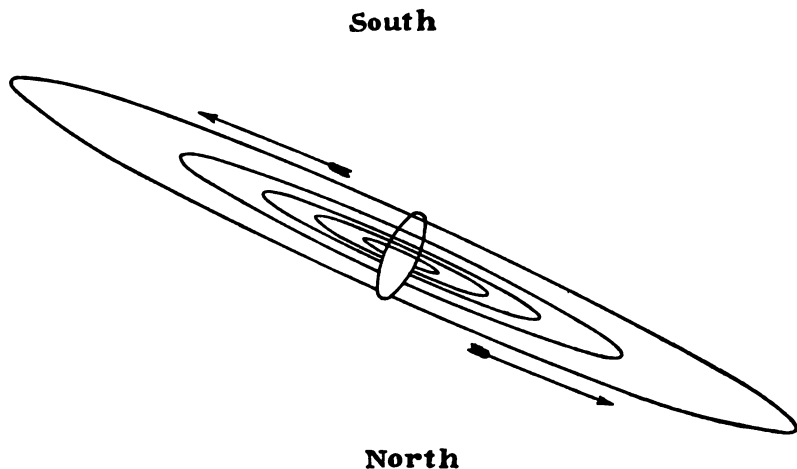
EPHEMERIS FOR PHYSICAL OBSERVATIONS OF JUPITER, SYSTEM
WASHINGTON MEAN TIME.

Transit of Zero Meridian.				Interval between Successive Transits.		Transit of Zero Meridian.				Interval between Successive Transits.		Transit of Zero Meridian.				Interval between Successive Transits.	
Jan.	d	h	m	h	m	June	d	h	m	h	m	Sept.	d	h	m	h	
	0	22	59.21	9	50.67		3	18	24.39	9	50.53		18	9	2.34	9 54	
	3	0	12.57				5	19	37.05				20	10	14.41		
	5	1	25.93				7	20	49.69				22	11	26.50		
	7	2	39.29				9	22	2.31				24	12	38.61		
	9	3	52.65				11	23	14.92				26	13	50.73		
	11	5	6.02	9	50.67		14	0	27.51	9	50.52		28	15	2.87	9 54	
	13	6	19.38				16	1	40.08				30	16	15.03		
	15	7	32.75				18	2	52.64			Oct.	2	17	27.22		
	17	8	46.12				20	4	5.18				4	18	39.43		
	19	9	59.48				22	5	17.71				6	19	51.67		
	21	11	12.85	9	50.67		24	6	30.22	9	50.50		8	21	3.93	9 54	
	23	12	26.22				26	7	42.71				10	22	16.22		
	25	13	39.58				28	8	55.18				12	23	28.53		
	27	14	52.94				30	10	7.64				15	0	40.87		
	29	16	6.30			July	2	11	20.08				17	1	53.24		
	31	17	19.65	9	50.67		4	12	32.50	9	50.48		19	3	5.64	9 54	
							6	13	44.91				21	4	18.07		
Mar.	26	1	4.98	9	50.63		8	14	57.29				23	5	30.52		
	28	2	18.13				10	16	9.66				25	6	43.00		
							12	17	22.01				27	7	55.51		
	30	3	31.26	9	50.63		14	18	34.34	9	50.46		29	9	8.05	9 54	
Apr.	1	4	44.39				16	19	46.66			Nov.	31	10	20.62		
	3	5	57.50				18	20	58.96				2	11	33.22		
	5	7	10.60				20	22	11.24				4	12	45.84		
	7	8	23.69				22	23	23.51				6	13	58.49		
	9	9	36.77	9	50.61		25	0	35.76	9	50.45		8	15	11.17	9 54	
	11	10	49.83				27	1	48.00				10	16	23.88		
	13	12	2.88				29	3	0.22				12	17	36.62		
	15	13	15.92				31	4	12.42				14	18	49.38		
	17	14	28.94			Aug.	2	5	24.61				16	20	2.17		
	19	15	41.95	9	50.60		4	6	36.78	9	50.43		18	21	14.98	9 54	
	21	16	54.94				6	7	48.94				20	22	27.82		
	23	18	7.92				8	9	1.09				22	23	40.69		
	25	19	20.88				10	10	13.22				25	0	53.58		
	27	20	33.83				12	11	25.34				27	2	6.49		
	29	21	46.77	9	50.59		14	12	37.44	9	50.42		29	3	19.43	9 54	
May	1	22	59.69				16	13	49.54			Dec.	1	4	32.39		
	4	0	12.60				18	15	1.62				3	5	45.37		
	6	1	25.49				20	16	13.70				5	6	58.38		
	8	2	38.37				22	17	25.77				7	8	11.40		
	10	3	51.23	9	50.57		24	18	37.83	9	50.41		9	9	24.44	9 54	
	12	5	4.08				26	19	49.88				11	10	37.50		
	14	6	16.91				28	21	1.93				13	11	50.58		
	16	7	29.73				30	22	13.97				15	13	3.68		
	18	8	42.53			Sept.	1	23	26.01				17	14	16.80		
	20	9	55.32	9	50.56		4	0	38.04	9	50.41		19	15	29.94	9 54	
	22	11	8.09				6	1	50.08				21	16	43.09		
	24	12	20.85				8	3	2.11				23	17	56.26		
	26	13	33.59				10	4	14.14				25	19	9.44		
	28	14	46.32				12	5	26.18				27	20	22.64		
	30	15	59.03	9	50.54		14	6	38.23	9	50.41		29	21	35.84	0 5	
June	1	17	11.72				16	7	50.28				31	22	49.06		

S FOR PHYSICAL OBSERVATIONS OF JUPITER, SYSTEM II.

WASHINGTON MEAN TIME.

m	Interval between Successive Transits.	Transit of Zero Meridian.			Interval between Successive Transits.	Transit of Zero Meridian.			Interval between Successive Transits.
	h m	d h m			h m	d h m			h m
2.35	9 55.85	June	2 15 51.54		9 55.71	Sept.	18 4 55.66		9 55.59
2.61			4 17 30.10				20 6 33.61		
3.86			6 19 8.64				22 8 11.58		
3.12			8 20 47.16				24 9 49.56		
7.39			10 22 25.67				26 11 27.56		
5.65	9 55.85		13 0 4.16		9 55.70		28 13 5.58		9 55.61
5.92			15 1 42.63			Oct.	30 14 43.62		
5.18			17 3 21.08				2 16 21.69		
4.45			19 4 59.52				4 17 59.78		
3.72			21 6 37.94				6 19 37.89		
1.98	9 55.85		23 8 16.35		9 55.68		8 21 16.04		9 55.63
1.24			25 9 54.74				10 22 54.21		
1.51			27 11 33.10				13 0 32.40		
2.77			29 13 11.46				15 2 10.63		
2.02		July	1 14 49.79				17 3 48.88		
2.28	9 55.85		3 16 28.11		9 55.66		19 5 27.16		9 55.66
			5 18 6.41				21 7 5.47		
1.37	9 55.81		7 19 44.69				23 8 43.81		
2.43			9 21 22.95				25 10 22.18		
			11 23 1.19				27 12 0.58		
2.48	9 55.81		14 0 39.42		9 55.64		29 13 39.00		9 55.69
5.51			16 2 17.63			Nov.	31 15 17.46		
7.53			18 3 55.82				2 16 55.94		
5.54			20 5 33.99				4 18 34.45		
5.53			22 7 12.15				6 20 13.00		
4.51	9 55.80		24 8 50.28		9 55.63		8 21 51.57		9 55.77
3.48			26 10 28.41				10 23 30.17		
2.44			28 12 6.51				13 1 8.79		
1.38			30 13 44.60				15 2 47.45		
2.31		Aug.	1 15 22.68				17 4 26.13		
2.22	9 55.78		3 17 0.73		9 55.61		19 6 4.84		9 55.74
3.12			5 18 38.78				21 7 43.57		
7.01			7 20 16.80				23 9 22.33		
5.88			9 21 54.82				25 11 1.12		
4.74			11 23 32.82				27 12 39.93		
3.58	9 55.77		14 1 10.81		9 55.60	Dec.	29 14 18.76		9 55.77
2.40			16 2 48.79				1 15 57.62		
1.22			18 4 26.75				3 17 36.50		
2.02			20 6 4.72				5 19 15.40		
3.80			22 7 42.67				7 20 54.32		
7.57	9 55.75		24 9 20.61		9 55.59		9 22 33.26		9 55.79
5.32			26 10 58.54				12 0 12.23		
5.06			28 12 36.47				14 1 51.21		
3.78			30 14 14.39				16 3 30.21		
2.48		Sept.	1 15 52.31				18 5 9.23		
1.17	9 55.74		3 17 30.22		9 55.58		20 6 48.26		9 55.81
2.84			5 19 8.13				22 8 27.31		
3.50			7 20 46.04				24 10 6.38		
7.14			9 22 23.96				26 11 45.46		
5.77			12 0 1.87				28 13 24.56		
4.38	9 55.72		14 1 39.79		9 55.58		30 15 3.66		9 55.82
2.97			16 3 17.72				32 16 42.78		



APPARENT ORBITS OF THE SATELLITES OF JUPITER AT DATE OF OPPOSITION, SEPTEMBER 16, 1915, AS SEEN IN AN INVERTING TELESCOPE, AND ELONGATED IN THE RATIO OF THREE TO ONE IN THE DIRECTION OF THEIR MINOR AXES.

In the above diagram the central ellipse represents the disk of Jupiter, and the inner orbit is that of Satellite V.

In the diagrams of the configurations of Jupiter's four brighter satellites, pages 635-655, Jupiter is represented by a light disk, ○, in the center of the page, and the relative positions of the satellites at the Washington time stated above the diagrams are indicated by dots. The designation of each satellite is shown by a numeral placed to the right or left of the dot, according as the motion of the satellite at the instant in question is toward the east or toward the west, the motion being always toward the numeral. In constructing the diagrams the latitudes of the satellites are always considered zero, except where two or more of them chance to be at nearly the same distance from the planet, when they are placed one above the other, according to their apparent latitudes. If, at the epoch of any configuration, one or more satellites are projected on the disk of the planet, that phenomenon is indicated by a light disk, ○, at the left-hand side of the page; and if any satellites are invisible on account of being occulted behind the disk of the planet, or eclipsed by its shadow, that circumstance is indicated by a dark disk, ●, at the right-hand side of the page. In both cases the annexed numerals serve to point out which satellites are thus rendered invisible.

MEAN SYNODIC PERIODS OF THE SATELLITES.

	d	h	m	s	=	d			d	h	m	s	=	d
I.	1	18	28	35.945	=	1.769	860	48	V.	0	11	57	27.635	= 0.498 236 52
II.	3	13	17	53.735	=	3.554	094	16	VI.				=266.00	
III.	7	3	59	35.854	=	7.166	387	20	VII.				=276.67	
IV.	16	18	5	6.928	=	16.753	552	41						

(Eph 15)

SATELLITE V.

WASHINGTON MEAN TIME OF EVERY TWENTIETH GREATEST ELONGATION.

ly	d	h		Oct.	d	h		July	d	h		Sept.	d	h		
	4	16.1	E.		2	7.9	E.		4	10.1	W.		22	14.8	W.	
	14	15.2	E.		12	7.0	E.		14	9.2	W.		Oct.	2	13.9	W.
	24	14.3	E.						24	8.3	W.			12	13.0	W.
g.	3	13.4	E.	Nov.	22	18.1	E.	Aug.	3	7.4	W.	Nov.	22	12.1	W.	
	13	12.5	E.		1	17.2	E.		13	6.5	W.		1	11.2	W.	
	23	11.6	E.		11	16.3	E.						11	10.4	W.	
	2	10.6	E.		21	15.5	E.		23	17.5	W.		21	9.5	W.	
pt.	12	9.7	E.	Dec.	1	14.6	E.	Sept.	2	16.6	W.	Dec.	1	8.7	W.	
	22	8.8	E.		11	13.8	E.		12	15.7	W.		11	7.8	W.	

WASHINGTON MEAN TIME OF SUPERIOR GEOCENTRIC CONJUNCTION.

SATELLITE I.

d	h	m	May	d	h	m	Aug.	d	h	m	Oct.	d	h	m
1.	1	17 19.5		18	2 10.0			3	22 52.6			20	18 7.1	
	3	11 49.8		19	20 39.4			5	17 19.4			22	12 33.9	
	5	6 20.1		21	15 8.8			7	11 46.1			24	7 0.7	
	7	0 50.4		23	9 38.2			9	6 12.8			26	1 27.6	
	8	19 20.7		25	4 7.5			11	0 39.4			27	19 54.6	
	10	13 51.0		26	22 36.8			12	19 5.9			29	14 21.6	
	12	8 21.4		28	17 6.0			14	13 32.3			31	8 48.8	
	14	2 51.8		30	11 35.2			16	7 58.8			Nov.	2	3 16.0
	15	21 22.2		June	1	6 4.3		18	2 25.2			3	21 43.3	
	17	15 52.6		3	0 33.4			19	20 51.5			5	16 10.6	
	19	10 23.0		4	19 2.4			21	15 17.8			7	10 38.0	
	21	4 53.4		6	13 31.4			23	9 44.0			9	5 5.5	
	22	23 23.9		8	8 0.3			25	4 10.2			10	23 33.1	
				10	2 29.2			26	22 36.4			12	18 0.8	
				11	20 58.0			28	17 2.5			14	12 28.6	
				13	15 26.7			30	11 28.6			16	6 56.4	
r.	27	17 41.2		15	9 55.3			Sept.	1	5 54.6		18	1 24.3	
	29	12 11.5		17	4 24.0			3	0 20.6			19	19 52.2	
	31	6 41.8		18	22 52.6			4	18 46.6			21	14 20.3	
r.	2	1 12.1		20	17 21.1			6	13 12.6			23	8 48.4	
	3	19 42.4		22	11 49.5			8	7 38.6			25	3 16.6	
	5	14 12.6		24	6 17.9			10	2 4.6			26	21 44.9	
	7	8 42.8		26	0 46.2			11	20 30.6			28	16 13.3	
	9	3 13.0		27	19 14.5			13	14 56.6			30	10 41.7	
	10	21 43.2		29	13 42.7			15	9 22.5			Dec.	2	5 10.2
	12	16 13.3		July	1	8 10.9		17	3 48.4			3	23 38.8	
	14	10 43.4		3	2 39.0			18	22 14.4			5	18 7.4	
	16	5 13.5		4	21 7.0			20	16 40.4			7	12 36.1	
	17	23 43.6		6	15 34.9			22	11 6.4			9	7 4.9	
	19	18 13.6		8	10 2.8			24	5 32.4			11	1 33.8	
	21	12 43.7		10	4 30.6			25	23 58.4			12	20 2.7	
	23	7 13.7		11	22 58.3			27	18 24.4			14	14 31.6	
	25	1 43.6		13	17 25.9			29	12 50.5			16	9 0.6	
	26	20 13.5		15	11 53.5			Oct.	1	7 16.6		18	3 29.7	
	28	14 43.4		17	6 21.1			3	1 42.8			19	21 58.9	
	30	9 13.2		19	0 48.6			4	20 9.0			21	16 28.1	
y	2	3 43.1		20	19 16.0			6	14 35.2			23	10 57.4	
	3	22 12.9		22	13 43.3			8	9 1.5			25	5 26.7	
	5	16 42.7		24	8 10.5			10	3 27.8			26	23 56.1	
	7	11 12.4		26	2 37.7			11	21 54.2			28	18 25.6	
	9	5 42.1		27	21 4.8			13	16 20.7			30	12 55.1	
	11	0 11.7		29	15 31.9			15	10 47.2					
	12	18 41.3		31	9 58.9			17	5 13.8					
	14	13 10.9		Aug.	2	4 25.8		18	23 40.4					
	16	7 40.5												

WASHINGTON MEAN TIME OF SUPERIOR GEOCENTRIC CONJUNCTION.

SATELLITE II.

d	h	m	d	h	m	d	h	m	d	h	m
Jan. 3	11	50.8	May 18	17	45.4	Aug. 4	21	33.6	Oct. 21	22	24.0
7	1	15.9	22	7	6.2	8	10	43.2	25	11	34.3
10	14	42.2	25	20	26.8	11	23	52.5	29	0	44.9
14	4	7.7	29	9	46.9	15	13	1.3	Nov. 1	13	56.4
17	17	34.3	June 1	23	6.4	19	2	9.7	5	3	8.1
21	7	0.0	5	12	25.6	22	15	17.7	8	16	20.9
			9	1	44.3	26	4	25.4	12	5	33.8
Mar. 29	22	18.7	12	15	2.6	29	17	32.7	15	18	47.9
Apr. 2	11	43.6	16	4	20.4	Sept. 2	6	39.8	19	8	2.3
			19	17	37.7	5	19	46.7	22	21	17.8
6	1	8.6	23	6	54.5	9	8	53.4	26	10	33.4
9	14	33.1	26	20	10.7	12	21	59.9	29	23	50.1
13	3	57.7	30	9	26.4	16	11	6.3	Dec. 3	13	7.0
16	17	21.6	July 3	22	41.7	20	0	12.9	7	2	25.0
20	6	45.7	7	11	56.3	23	13	19.6	10	15	43.1
23	20	9.1	11	1	10.5	27	2	26.5	14	5	2.5
27	9	32.6	14	14	24.0	30	15	33.6	17	18	21.7
30	22	55.4	18	3	37.0	Oct. 4	4	41.0	21	7	42.2
May 4	12	18.2	21	16	49.4	7	17	48.7	24	21	2.5
8	1	40.4	25	6	1.3	11	6	56.9	28	10	24.1
11	15	2.5	28	19	12.6	14	20	5.4	31	23	45.2
15	4	24.1	Aug. 1	8	23.4	18	9	14.5			

SATELLITE III.

d	h	m	d	h	m	d	h	m	d	h	m
Jan. 5	7	0.4	May 14	15	29.0	Aug. 1	10	56.1	Oct. 18	23	41.9
12	11	28.4	21	19	44.4	8	14	26.8	26	3	9.9
19	15	57.3	28	23	57.0	15	17	53.2	Nov. 2	6	42.6
			June 5	4	6.5	22	21	15.5	9	10	20.6
			12	8	13.0	30	0	34.8	16	14	3.2
Apr. 1	13	6.9	19	12	15.2	Sept. 6	3	52.1	23	17	50.8
8	17	35.0	26	16	13.4	13	7	8.0	30	21	43.0
15	22	1.5	July 3	20	6.9	20	10	24.1	Dec. 8	1	40.1
23	2	27.0	10	23	55.7	27	13	40.3	15	5	42.2
30	6	49.9	18	3	40.5	Oct. 4	16	58.1	22	9	48.4
May 7	11	10.9	25	7	20.3	11	20	18.1	29	13	59.0

SATELLITE IV.

d	h	m	d	h	m	d	h	m	d	h	m
Jan. 16	17	19.2	May 14	18	5.9	Aug. 6	10	44.4	Oct. 28	11	30.6
			31	13	28.5	23	1	44.1	Nov. 14	3	42.2
Apr. 11	1	45.1	June 17	8	8.5	Sept. 8	16	4.7	30	20	48.5
27	22	8.8	July 4	1	59.0	25	6	11.7	Dec. 17	14	54.0
			20	18	51.3	Oct. 11	20	35.1			

[Eph 13]

DIFFERENTIAL COORDINATES OF SATELLITE VI.

Washington Mean Noon.	$\alpha_{VI}-\alpha_{Jup.}$	$\delta_{VI}-\delta_{Jup.}$	Washington Mean Noon.	$\alpha_{VI}-\alpha_{Jup.}$	$\delta_{VI}-\delta_{Jup.}$	Washington Mean Noon.	$\alpha_{VI}-\alpha_{Jup.}$	$\delta_{VI}-\delta_{Jup.}$
	m s	'		m s	'		m s	'
Jan. 0	+1 6	-12.7	June 26	+2 54	-7.7	Oct. 4	+1 11	+0.2
4	0 52	11.9	30	3 10	7.9	8	0 43	0.7
8	0 38	11.1	July 4	3 26	8.0	12	+0 15	1.2
12	+0 24	-10.2	8	3 41	8.1	16	-0 12	1.7
	...	...	12	3 55	8.1	20	0 38	2.2
Apr. 7	-2 27	+4.6	16	+4 8	-8.0	24	-1 3	+2.7
11	2 21	4.3	20	4 20	7.8	28	1 27	3.2
15	2 13	3.9	24	4 29	7.6	Nov. 1	1 49	3.7
19	2 3	3.4	28	4 37	7.3	5	2 8	4.2
23	1 52	2.9	Aug. 1	4 44	7.0	9	2 26	4.6
27	-1 39	+2.2	5	+4 48	-6.6	13	-2 40	+5.0
May 1	1 24	1.5	9	4 50	6.2	17	2 52	5.3
5	1 9	+0.7	13	4 49	5.7	21	3 1	5.5
9	0 52	-0.1	17	4 46	5.3	25	3 8	5.6
13	0 35	1.0	21	4 41	4.8	29	3 11	5.6
17	-0 17	-1.8	25	+4 33	-4.3	Dec. 3	-3 11	+5.5
21	+0 2	2.6	29	4 23	3.8	7	3 9	5.3
25	0 21	3.4	Sept. 2	4 10	3.3	11	3 4	5.0
29	0 41	4.2	6	3 54	2.9	15	2 56	4.6
June 2	1 0	4.9	10	3 36	2.4	19	2 46	4.1
6	+1 20	-5.5	14	+3 16	-2.0	23	-2 35	+3.5
10	1 39	6.1	18	2 54	1.6	27	2 21	2.8
14	1 58	6.7	22	2 30	1.2	31	-2 6	+2.0
18	2 17	7.1	26	2 5	0.7			
22	+2 36	-7.5	30	+1 38	-0.3			

DIFFERENTIAL COORDINATES OF SATELLITE VII.

Washington Mean Noon.	$\alpha_{VII}-\alpha_{Jup.}$	$\delta_{VII}-\delta_{Jup.}$	Washington Mean Noon.	$\alpha_{VII}-\alpha_{Jup.}$	$\delta_{VII}-\delta_{Jup.}$	Washington Mean Noon.	$\alpha_{VII}-\alpha_{Jup.}$	$\delta_{VII}-\delta_{Jup.}$
	m s	'		m s	'		m s	'
Jan. 0	+1 27	+28.4	June 26	-4 18	-2.1	Oct. 4	+1 17	+29.1
4	1 36	27.8	30	4 21	-0.6	8	1 38	28.6
8	1 44	27.1	July 4	4 24	+0.9	12	1 57	27.8
12	1 51	+26.3	8	4 25	2.5	16	2 15	26.7
	...	...	12	4 25	4.1	20	2 31	25.4
Apr. 7	+0 45	-12.2	16	-4 23	+5.8	24	+2 46	+23.8
11	0 25	13.5	20	4 20	7.6	28	2 59	22.0
15	+0 5	14.6	24	4 15	9.4	Nov. 1	3 9	19.9
19	-0 16	15.4	28	4 9	11.2	5	3 17	17.5
23	0 37	16.0	Aug. 1	4 0	13.0	9	3 22	15.0
27	-0 57	-16.4	5	-3 50	+14.8	13	+3 25	+12.3
May 1	1 18	16.5	9	3 38	16.7	17	3 24	9.4
5	1 38	16.3	13	3 23	18.4	21	3 21	6.5
9	1 57	15.9	17	3 7	20.1	25	3 14	3.6
13	2 15	15.3	21	2 49	21.6	29	3 4	+0.8
17	-2 33	-14.6	25	-2 30	+23.1	Dec. 3	+2 51	-2.0
21	2 49	13.6	29	2 9	24.4	7	2 35	4.6
25	3 4	12.6	Sept. 2	1 47	25.6	11	2 17	7.0
29	3 18	11.4	6	1 24	26.7	15	1 57	9.1
June 2	3 30	10.2	10	1 1	27.6	19	1 36	11.0
6	-3 41	-8.9	14	-0 37	+28.3	23	+1 14	-12.5
10	3 51	7.6	18	-0 13	28.9	27	0 51	13.8
14	3 59	6.3	22	+0 10	29.2	31	+0 27	-14.8
18	4 7	4.9	26	0 33	29.4			
22	-4 13	-3.5	30	+0 56	+29.3			

WASHINGTON MEAN TIME.

JANUARY.

d	h	m	s				d	h	m	s				d	h	m	s				
1	14	52		III.	Tr.	In.	8	21	14	53		I.	Ec.	16	17	29		I.	Tr.	In.	
	15	40		II.	Tr.	In.		21	24			II.	Tr.		18	9		I.	Sh.	In.	
	16	9		I.	Oc.	Dis.		22	31			III.	Sh.		19	46		IV.	Oc.	Re.	
	17	25		II.	Sh.	In.		22	56			II.	Sh.		19	50		I.	Tr.	Eg.	
	18	29		III.	Sh.	In.		23	0			III.	Tr.		20	29		I.	Sh.	Eg.	
	18	33		III.	Tr.	Eg.	9	2	7			III.	Sh.		21	14	26	IV.	Ec.	Dis.	
	18	36		II.	Tr.	Eg.		15	27			I.	Tr.		17	1	43	7	IV.	Ec.	Re.
	19	19	57	I.	Ec.	Re.		16	13			I.	Sh.		14	42		I.	Oc.	Dis.	
	20	21		II.	Sh.	Eg.		17	47			I.	Tr.		16	6		II.	Oc.	Dis.	
	22	6		III.	Sh.	Eg.		18	33			I.	Sh.		17	38	30	I.	Ec.	Re.	
2	13	25		I.	Tr.	In.	10	12	41			I.	Oc.	18	20	19	22	II.	Ec.	Re.	
	14	18		I.	Sh.	In.		13	14			II.	Oc.		12	0		I.	Tr.	In.	
	15	46		I.	Tr.	Eg.		15	43	38		I.	Ec.		12	38		I.	Sh.	In.	
	16	38		I.	Sh.	Eg.		17	41	4		II.	Ec.		14	20		I.	Tr.	Eg.	
3	10	23		II.	Oc.	Dis.	11	9	58			I.	Tr.		14	58		I.	Sh.	Eg.	
	10	40		I.	Oc.	Dis.		10	42			I.	Sh.		19	9	13	I.	Oc.	Dis.	
	13	48	42	I.	Ec.	Re.		12	18			I.	Tr.		10	40		II.	Tr.	In.	
	15	2	40	II.	Ec.	Re.		13	2			I.	Sh.		11	53		II.	Sh.	In.	
4	7	56		I.	Tr.	In.	12	7	11			I.	Oc.		12	7	11	I.	Ec.	Re.	
	8	47		I.	Sh.	In.		7	52			II.	Tr.		13	37		II.	Tr.	Eg.	
	10	16		I.	Tr.	Eg.		9	18			II.	Sh.		14	7		III.	Oc.	Dis.	
	11	7		I.	Sh.	Eg.		9	38			III.	Oc.		14	49		II.	Sh.	Eg.	
5	5	4		II.	Tr.	In.		10	12	20		I.	Ec.		20	8	26	III.	Ec.	Re.	
	5	10		III.	Oc.	Dis.		10	48			II.	Tr.		20	6	30	I.*	Tr.	In.	
	5	10		I.	Oc.	Dis.		12	14			II.	Sh.		7	7		I.	Sh.	In.	
	6	42		II.*	Sh.	In.		16	7	34		III.	Ec.		8	50		I.	Tr.	Eg.	
	8	0		II.	Tr.	Eg.	13	4	28			I.	Tr.		9	26		I.	Sh.	Eg.	
	8	17	25	I.	Ec.	Re.		5	11			I.	Sh.		21	3	43	I.	Oc.	Dis.	
	9	38		II.	Sh.	Eg.		6	48			I.*	Tr.		5	32		II.	Oc.	Dis.	
	12	6	5	III.	Ec.	Re.		7	31			I.	Sh.		6	35	52	I.*	Ec.	Re.	
6	2	26		I.	Tr.	In.	14	1	42			I.	Oc.		9	37	55	II.	Ec.	Re.	
	3	16		I.	Sh.	In.		2	40			II.	Oc.		22	1	1	I.	Tr.	In.	
	4	46		I.	Tr.	Eg.		4	41	2		I.	Ec.		1	35		I.	Sh.	In.	
	5	36		I.*	Sh.	Eg.		6	59	41		II.*	Ec.		3	21		I.	Tr.	Eg.	
	23	40		I.	Oc.	Dis.		22	59			I.	Tr.		3	55		I.	Sh.	Eg.	
	23	48		II.	Oc.	Dis.		23	40			I.	Sh.		22	14		I.	Oc.	Dis.	
7	2	46	9	I.	Ec.	Re.	15	1	19			I.	Tr.		23	0	5	II.	Tr.	In.	
	4	21	19	II.	Ec.	Re.		2	0			I.	Sh.		1	4	34	I.	Ec.	Re.	
	20	57		I.	Tr.	In.		20	12			I.	Oc.		1	11		II.	Sh.	In.	
	21	45		I.	Sh.	In.		21	16			II.	Tr.		3	1		II.	Tr.	Eg.	
	23	17		I.	Tr.	Eg.		22	36			II.	Sh.		4	7		II.	Sh.	Eg.	
8	0	4		I.	Sh.	Eg.		23	9	46		I.	Ec.		4	18		III.	Tr.	In.	
	5	24		IV.	Tr.	In.		23	48			III.	Tr.		6	34		III.*	Sh.	In.	
	10	19		IV.	Tr.	Eg.	16	0	12			II.	Tr.		7	57		III.	Tr.	Eg.	
	13	3		IV.	Sh.	In.		1	32			II.	Sh.		10	9		III.	Sh.	Eg.	
	17	48		IV.	Sh.	Eg.		2	33			III.	Sh.		19	32		I.	Tr.	In.	
	18	11		I.	Oc.	Dis.		3	28			III.	Tr.		20	4		I.	Sh.	In.	
	18	28		II.	Tr.	In.		6	8			III.*	Sh.		21	52		I.	Tr.	Eg.	
	19	19		III.	Tr.	In.		14	52			IV.	Oc.		22	24		I.	Sh.	Eg.	
	20	0		II.	Sh.	In.															

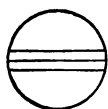
By reason of the proximity of JUPITER to the SUN the phenomena of the satellites are not given from January 24 to March 26.

NOTE.—In. denotes ingress; Eg., egress; Dis., disappearance; Re., reappearance; Ec., eclipse.
Oc. denotes occultation; Tr., transit of the satellite; Sh., transit of the shadow; * Visible at Washington.

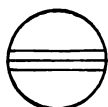
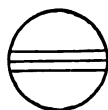
WASHINGTON MEAN TIME.

JANUARY.

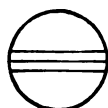
Phases of the Eclipses of the Satellites for an Inverting Telescope.



III.



IV.



Configurations at 6^h 15^m for an Inverting Telescope.

West.

East.

	1'	○	3'2'	'4	
	2'3'	○	1'	'4	
3'	'1'2	○		'4	
'3		○	1'	'2	4'
		○		4'	'1 ● '3 ●
'2	1'	○	'3	4'	
		○	'2'1	4'	3'
1'		○		3'	2'
4' 2' 3'		○	1'		
4' 3'	'2	○			
4'	'3	○	1'	'2	
		○	'3'1	2'	
'4	2'	○		'3	
		○	'1	'3	'2 ●
'4	1'	○	2'3'		
	'4 3'	○	'1		
3'	'2'1	○	'4		
'3		○	1'	'2	'4
	'3'1	○	2'	'4	
2'		○	1'	'3	'4
		○		'3	4' '1 ● '2 ●
1'		○	2' 3'	4'	
2'		○	'1	4'	

[Eph 15]

WASHINGTON MEAN TIME.

MARCH.

By reason of the proximity of JUPITER to the SUN the phenomena of the satellites are not given from January 24 to March 26.

d	h	m	s		d	h	m	s		d	h	m	s	
27	16	0	46	I. Ec. Dis.	28	18	48		III. Sh. In.	30	8	23		I. Tr. In.
	18	51		I. Oc. Re.		21	8		III. Tr. In.		10	7		I. Sh. Eg.
28	0	31		II. Sh. In.		22	16		III. Sh. Eg.		10	42		I. Tr. Eg.
	1	38		II. Tr. In.	29	0	36		III. Tr. Eg.	31	4	57	56	I. Ec. Dis.
	3	26		II. Sh. Eg.		10	29	24	I. Ec. Dis.		7	51		I. Oc. Re.
	4	33		II. Tr. Eg.		13	21		I. Oc. Re.		13	49		II. Sh. In.
	13	19		I. Sh. In.		19	42	9	II. Ec. Dis.		15	3		II. Tr. In.
	13	53		I. Tr. In.		23	46		II. Oc. Re.		16	44		II. Sh. Eg.
	15	38		I. Sh. Eg.	30	7	48		I. Sh. In.		17	58		II. Tr. Eg.
	16	12		I. Tr. Eg.										

NOTE.—In. denotes ingress; Eg., egress; Dis., disappearance; Re., reappearance; Ec., eclipse.

Oc. denotes occultation; Tr., transit of the satellite; Sh., transit of the shadow; * Visible at Washington.

(Eph 15)

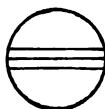
WASHINGTON MEAN TIME.

MARCH.

Phases of the Eclipses of the Satellites for an Inverting Telescope.



III. No Eclipse.



IV. No Eclipse.



Configurations at 17^h 15^m for an Inverting Telescope.

West.

East.



2°

3°

4°

1° ●

2°

3°

4°

3°

2°

1°

4°

3°

1°

2°

4°

3°

1°

4°

WASHINGTON MEAN TIME.

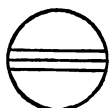
APRIL.

d	h	m	s		d	h	m	s		d	h	m	s		d	h	m	s	
1	2	16			11	5	43			20	15	49			20	15	49		
	2	54		I. Sh. In.		7	18		II. Sh. In.		16	44				16	44		I. Sh.
	4	35		I. Tr. In.		8	38		II. Sh. Eg.		21	10	40	36		21	10	40	I. * Tr.
	5	13		I. Tr. Eg.		10	12		II. Tr. Eg.		13	53				13	53		I. Ec.
	8	54	4	III. Ec. Dis.		17	8		I. Sh. In.		21	37				21	37		II. Sh.
	14	50		III. Oc. Re.		17	55		I. Tr. In.		23	31				23	31		II. Tr.
	23	26	32	I. Ec. Dis.		19	27		I. Sh. Eg.		23	0	31			23	0	31	II. Sh.
2	2	22		I. Oc. Re.		20	14		I. Tr. Eg.		2	24				2	24		II. Tr.
	8	23		IV. Sh. In.	12	2	50		III. Sh. In.		7	59				7	59		I. Sh.
	9	0	9	II. Ec. Dis.		6	6		III. Tr. In.		8	56				8	56		I. Tr.
	12	47		IV. Sh. Eg.		6	17		III. Sh. Eg.		10	18				10	18		I. Sh.
	13	11		II. Oc. Re.		9	30		III. Tr. Eg.		11	14				11	14		I. Tr.
	14	38		IV. Tr. In.		14	17	54	I. Ec. Dis.		20	57	12			20	57	12	III. Ec.
	19	0		IV. Tr. Eg.		17	23		I. Oc. Re.		23	0	12	53		23	0	12	III. Ec.
	20	45		I. Sh. In.	13	0	54	47	II. Ec. Dis.		0	47				0	47		III. Oc.
	21	24		I. Tr. In.		5	25		II. Oc. Re.		4	7				4	7		III. Oc.
	23	4		I. Sh. Eg.		11	36		I. Sh. In.		5	9	10			5	9	10	I. Ec.
	23	43		I. Tr. Eg.		12	25		I. Tr. In.		8	23				8	23		I. Oc.
3	17	55	3	I. Ec. Dis.		13	55		I. Sh. Eg.		16	48	33			16	48	33	II. Ec.
	20	52		I. Oc. Re.		14	44		I. Tr. Eg.		21	36				21	36		II. Oc.
4	3	7		II. Sh. In.	14	8	46	25	I. Ec. Dis.		24	2	27			24	2	27	I. Sh.
	4	28		II. Tr. In.		11	53		I. Oc. Re.		3	26				3	26		I. Tr.
	6	2		II. Sh. Eg.		19	0		II. Sh. In.		4	46				4	46		I. Sh.
	7	23		II. Tr. Eg.		20	42		II. Tr. In.		5	44				5	44		I. Tr.
	15	13		I. Sh. In.		21	55		II. Sh. Eg.		23	37	39			23	37	39	I. Ec.
	15	54		I. Tr. In.		23	36		II. Tr. Eg.		25	2	53			25	2	53	I. Oc.
	17	32		I. Sh. Eg.	15	6	5		I. Sh. In.		10	55				10	55		II. Sh.
	18	13		I. Tr. Eg.		6	55		I. Tr. In.		12	55				12	55		II. Tr.
	22	49		III. Sh. In.		8	24		I. Sh. Eg.		13	49				13	49		II. Sh.
5	1	38		III. Tr. In.		9	14		I. Tr. Eg.		15	48				15	48		-II. Tr.
	2	17		III. Sh. Eg.		16	55	46	III. Ec. Dis.		20	56				20	56		I. Sh.
	5	4		III. Tr. Eg.		20	12	18	III. Ec. Re.		21	56				21	56		I. Tr.
	12	23	40	I. Ec. Dis.		20	20		III. Oc. Dis.		23	15				23	15		I. Sh.
	15	22		I. Oc. Re.		23	43		III. Oc. Re.		26	0	14			26	0	14	I. Tr.
	22	18	34	II. Ec. Dis.	16	3	14	59	I. Ec. Dis.		10	51				10	51		III. Sh.
6	2	36		II. Oc. Re.		6	23		I. Oc. Re.		14	16				14	16		III. Sh.
	9	42		I. Sh. In.		14	12	38	II. Ec. Dis.		14	58				14	58		III. Tr.
	10	25		I. Tr. In.		18	49		II. Oc. Re.		18	6	15			18	6	15	I. Ec.
	12	1		I. Sh. Eg.	17	0	33		I. Sh. In.		18	17				18	17		III. Tr.
	12	44		I. Tr. Eg.		1	26		I. Tr. In.		21	23				21	23		I. Oc.
7	6	52	12	I. Ec. Dis.		2	52		I. Sh. Eg.		27	6	6	33		27	6	6	II. Ec.
	9	52		I. Oc. Re.		3	44		I. Tr. Eg.		10	36	1			10	36	1	IV. Ec.
	16	24		II. Sh. In.		21	43	29	I. Ec. Dis.		10	59				10	59		II. Oc.
	17	53		II. Tr. In.	18	0	53		I. Oc. Re.		14	36	31			14	36	31	IV. Ec.
	19	19		II. Sh. Eg.		8	19		II. Sh. In.		15	24				15	24		I. Sh.
	20	47		II. Tr. Eg.		10	7		II. Tr. In.		16	26				16	26		I. * Tr.
8	4	10		I. Sh. In.		11	13		II. Sh. Eg.		17	43				17	43		I. Sh.
	4	55		I. Tr. In.		13	0		II. Tr. Eg.		18	44				18	44		I. Tr.
	6	30		I. Sh. Eg.		19	2		I. Sh. In.		20	10				20	10		IV. Oc.
	7	14		I. Tr. Eg.		19	56		I. Tr. In.		28	0	8			28	0	8	IV. Oc.
	12	54	56	III. Ec. Dis.		21	21		I. Sh. Eg.		12	34	45			12	34	45	I. Ec.
	19	17		III. Oc. Re.		22	14		I. Tr. Eg.		15	53				15	53		I. * Oc.
9	1	20	46	I. Ec. Dis.	19	2	38		IV. Sh. In.		29	0	13			29	0	13	II. Sh.
	4	22		I. Oc. Re.		6	51		III. Sh. In.		2	19				2	19		II. Tr.
	11	36	30	II. Ec. Dis.		6	56		IV. Sh. Eg.		3	7				3	7		II. Sh.
	16	0		II. Oc. Re.		10	17		III. Sh. Eg.		5	12				5	12		II. Tr.
	22	39		I. Sh. In.		10	33		III. Tr. In.		9	53				9	53		I. Sh.
	23	25		I. Tr. In.		11	24		IV. Tr. In.		10	55				10	55		I. Tr.
10	0	58		I. Sh. Eg.		13	55		III. Tr. Eg.		12	12				12	12		I. Sh.
	1	44		I. Tr. Eg.		15	30		IV. Tr. Eg.		13	14				13	14		I. Tr.
	16	22	40	IV. Ec. Dis.		16	12	5	I. Ec. Dis.		30	0	58	2		30	0	58	III. Ec.
	19	49	17	I. Ec. Dis.		19	23		I. Oc. Re.		4	12	50			4	12	50	III. Ec.
	20	28	57	IV. Ec. Re.	20	3	30	46	II. Ec. Dis.		5	11				5	11		III. Oc.
	22	53		I. Oc. Re.		8	13		II. Oc. Re.		7	3	19			7	3	19	I. Ec.
	23	38		IV. Oc. Dis.		13	30		I. Sh. In.		10	22				10	22		III. Oc.
11	3	52		IV. Oc. Re.		14	26		I. Tr. In.		19	24	15			19	24	15	II. Ec.

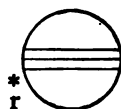
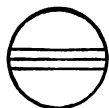
NOTE.—In. denotes ingress; Eg., egress; Dis., disappearance; Re., reappearance; Ec., eclipse.
Oc. denotes occultation; Tr., transit of the satellite; Sh., transit of the shadow; * Visible at W.
[Eph 13]

WASHINGTON MEAN TIME.

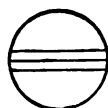
APRIL.

*Phases of the Eclipses of the Satellites for an Inverting Telescope.**
d

III.

*
d*
r*
d

IV.

*
d*
r*Configurations at 16^h 45^m for an Inverting Telescope.*

West.

East.

'2 '1 ○ '3 4'

○ '1/2 '3

4' '1 ○ 2' 3'

4' 2' ○ 3'

4' 3' '2 ○ '1

4' 3' 1' ○ '2

'4 '3 ○ 2' '1

'4 2' '1 ○ '3 ●

'4 ○ '2 1' '3

'1 ○ 2' 3' '4 ●

2' ○ 1' '43'

'23' ○ '4 '1 ●

3' 1' ○ '2 '4

'3 ○ 2''1 '4

2' 1' '3 ○ 4' '2 ●

○ 1' '3 4' '2 ●

'1 ○ 2' '4

2' ○ 1' 4'3'

'2 '4/3 ○ '1 ●

3'4' 1' ○ '2

4' '3 ○ '12'

4' 2' 1/3 ○

4' '2 ○ '1'3

'4 '1 ○ '2 '3

'4 2' ○ 1' 3'

'4 '2 '1 ○

3' '4 ○ '2

'3 ○ '1 2''4

'3 1' ○ '4

'2 ○ '1/3 '4

[Eph 15]

MAY.

d	h	m	s		d	h	m	s		d	h	m	s		d	h	m	s	
1	0	22		II. Oc. Re.	10	23	42		III. Tr. In.	20	19	8		I. Tr. Eg.	20	19	8		I. Tr. Eg.
	4	21		I. Sh. In.	11	1	21		I. Oc. Re.	21	12	45	42	I. Ec. Dis.		12	45	42	I. Ec. Dis.
	5	25		I. Tr. In.		2	56		III. Tr. Eg.		12	59	47	III. Ec. Dis.		12	59	47	III. Ec. Dis.
	6	40		I. Sh. Eg.		11	17	31	II. Ec. Dis.		16	11	50	III.* Ec. Re.		16	11	50	III.* Ec. Re.
	7	44		I. Tr. Eg.		16	29		II. Oc. Re.		16	18		I. Oc. Re.		16	18		I. Oc. Re.
2	1	31	48	I. Ec. Dis.		19	12		I. Sh. In.		18	9		III. Oc. Dis.		18	9		III. Oc. Dis.
	4	52		I. Oc. Re.		20	23		I. Tr. In.		21	20		III. Oc. Re.		21	20		III. Oc. Re.
	13	31		II. Sh. In.		21	31		I. Sh. Eg.	22	3	10	14	II. Ec. Dis.		3	10	14	II. Ec. Dis.
	15	42		II.* Tr. In.		22	42		I. Tr. Eg.		8	32		II. Oc. Re.		8	32		II. Oc. Re.
	16	26		II.* Sh. Eg.	12	16	23	1	I. Ec. Dis.		10	3		I. Sh. In.		10	3		I. Sh. In.
	18	35		II. Tr. Eg.		19	50		I. Oc. Re.		11	20		I. Tr. In.		11	20		I. Tr. In.
	22	50		I. Sh. In.	13	5	26		II. Sh. In.		12	22		I. Sh. Eg.		12	22		I. Sh. Eg.
	23	55		I. Tr. In.		7	52		II. Tr. In.		13	38		I. Tr. Eg.		13	38		I. Tr. Eg.
3	1	9		I. Sh. Eg.		8	20		II. Sh. Eg.		15	9		IV.* Sh. In.		15	9		IV.* Sh. In.
	2	13		I. Tr. Eg.		10	44		II. Tr. Eg.		19	15		IV. Sh. Eg.		19	15		IV. Sh. Eg.
	14	52		III. Sh. In.		13	41		I. Sh. In.	23	3	42		IV. Tr. In.		3	42		IV. Tr. In.
	18	16		III. Sh. Eg.		14	53		I.* Tr. In.		7	11		IV. Tr. Eg.		7	11		IV. Tr. Eg.
	19	21		III. Tr. In.		16	0		I.* Sh. Eg.		7	14	10	I. Ec. Dis.		7	14	10	I. Ec. Dis.
	20	0	24	I. Ec. Dis.		17	11		I. Tr. Eg.		10	47		I. Oc. Re.		10	47		I. Oc. Re.
	22	38		III. Tr. Eg.	14	4	49	44	IV. Ec. Dis.		21	21		II. Sh. In.		21	21		II. Sh. In.
	23	22		I. Oc. Re.		8	43	47	IV. Ec. Re.		23	58		II. Tr. In.		23	58		II. Tr. In.
4	8	42	8	II. Ec. Dis.		8	59	21	III. Ec. Dis.	24	0	15		II. Sh. Eg.		0	15		II. Sh. Eg.
	13	45		II. Oc. Re.		10	51	35	I. Ec. Dis.		2	50		II. Tr. Eg.		2	50		II. Tr. Eg.
	17	18		I. Sh. In.		12	12	21	III. Ec. Re.		4	32		I. Sh. In.		4	32		I. Sh. In.
	18	25		I. Tr. In.		13	53		III. Oc. Dis.		5	49		I. Tr. In.		5	49		I. Tr. In.
	19	37		I. Sh. Eg.		14	20		I. Oc. Re.		6	50		I. Sh. Eg.		6	50		I. Sh. Eg.
	20	43		I. Tr. Eg.		16	16		IV.* Oc. Dis.		8	7		I. Tr. Eg.		8	7		I. Tr. Eg.
5	14	28	54	I. Ec. Dis.		17	5		III. Oc. Re.	25	1	42	45	I. Ec. Dis.		1	42	45	I. Ec. Dis.
	17	52		I. Oc. Re.		19	55		IV. Oc. Re.		2	55		III. Sh. In.		2	55		III. Sh. In.
	20	53		IV. Sh. In.	15	0	35	5	II. Ec. Dis.		5	16		I. Oc. Re.		5	16		I. Oc. Re.
6	1	6		IV. Sh. Eg.		5	50		II. Oc. Re.		6	16		III. Sh. Eg.		6	16		III. Sh. Eg.
	2	49		II. Sh. In.		8	9		I. Sh. In.		8	16		III. Tr. In.		8	16		III. Tr. In.
	5	6		II. Tr. In.		9	22		I. Tr. In.		11	25		III. Tr. Eg.		11	25		III. Tr. Eg.
	5	43		II. Sh. Eg.		10	28		I. Sh. Eg.		16	27	46	III. Ec. Dis.		16	27	46	III. Ec. Dis.
	7	48		IV. Tr. In.		11	40		I. Tr. Eg.		21	53		II. Oc. Re.		21	53		II. Oc. Re.
	7	58		II. Tr. Eg.	16	5	20	3	I. Ec. Dis.		23	0		I. Sh. In.		23	0		I. Sh. In.
	11	37		IV. Tr. Eg.		8	50		I. Oc. Re.		0	18		I. Tr. In.		0	18		I. Tr. In.
	11	47		I. Sh. In.		18	44		II. Sh. In.		1	19		I. Sh. Eg.		1	19		I. Sh. Eg.
	12	54		I. Tr. In.		21	14		II. Tr. In.		2	36		I. Tr. Eg.		2	36		I. Tr. Eg.
	14	6		I. Sh. Eg.		21	38		II. Sh. Eg.		20	11	15	I. Ec. Dis.		20	11	15	I. Ec. Dis.
	15	13		I. Tr. Eg.	17	0	6		II. Tr. Eg.		23	46		I. Oc. Re.		23	46		I. Oc. Re.
7	4	58	54	III. Ec. Dis.		2	38		I. Sh. In.	27	10	39		II. Sh. In.		10	39		II. Sh. In.
	8	12	49	III. Ec. Re.		3	52		I. Tr. In.		13	30		II. Sh. Eg.		13	30		II. Sh. Eg.
	8	57	28	I. Ec. Dis.		4	56		I. Sh. Eg.		16	11		II. Tr. In.		16	11		II. Tr. In.
	9	33		III. Oc. Dis.		6	10		I. Tr. Eg.		17	28		I. Sh. In.		17	28		I. Sh. In.
	12	22		I. Oc. Re.		22	54		III. Sh. In.		18	48		I. Tr. Eg.		18	48		I. Tr. Eg.
	12	49		III. Oc. Re.		23	48	39	I. Ec. Dis.	28	14	39	49	I. Tr. Eg.		14	39	49	I. Tr. Eg.
	21	59	46	II. Ec. Dis.	18	2	16		III. Sh. Eg.		17	0	34	I.* Ec. Dis.		17	0	34	I.* Ec. Dis.
8	3	7		II. Oc. Re.		3	19		I. Oc. Re.		18	15		III. Ec. Re.		18	15		III. Ec. Re.
	6	16		I. Sh. In.		4	1		III. Tr. In.		20	11	39	III. Oc. Re.		20	11	39	III. Oc. Re.
	7	24		I. Tr. In.		7	12		III. Tr. Eg.	29	1	31		III. Ec. Dis.		1	31		III. Ec. Dis.
	8	34		I. Sh. Eg.		13	52	44	II. Ec. Dis.		5	45	13	II. Oc. Re.		5	45	13	II. Oc. Re.
	9	42		I. Tr. Eg.		19	12		II. Oc. Re.		11	13		II. Oc. Re.		11	13		II. Oc. Re.
9	3	25	56	I. Ec. Dis.		21	6		I. Sh. In.		11	57		I. Sh. In.		11	57		I. Sh. In.
	6	51		I. Oc. Re.		22	21		I. Tr. In.		13	17		I. Tr. In.		13	17		I. Tr. In.
	16	8		II.* Sh. In.		23	25		I. Sh. Eg.		14	16		I. Tr. In.		14	16		I. Tr. In.
	18	29		II. Tr. In.	19	0	39		I. Sh. Eg.	30	9	8	17	I.* Tr. Eg.		9	8	17	I.* Tr. Eg.
	19	2		II. Sh. Eg.		18	17	8	I. Tr. Eg.		12	44		I. Ec. Dis.		12	44		I. Ec. Dis.
	21	22		II. Tr. Eg.		21	48		I. Ec. Dis.		23	3	39	I. Oc. Re.		23	3	39	I. Oc. Re.
10	0	44		I. Sh. In.	20	8	2		I. Oc. Re.	31	2	42		II. Sh. In.		2	42		II. Sh. In.
	1	54		I. Tr. In.		10	36		II. Tr. In.		2	50	49	IV. Ec. Re.		2	50	49	IV. Ec. Re.
	3	3		I. Sh. Eg.		10	56		II. Sh. Eg.		3	51		IV. Ec. Re.		3	51		IV. Ec. Re.
	4	12		I. Tr. In.		13	28		II. Sh. Eg.		5	33		II. Tr. In.		5	33		II. Tr. In.
	18	53		III. Sh. In.		15	35		I.* Sh. In.		6	25		I. Sh. In.		6	25		I. Sh. In.
	21	54	32	I. Ec. Dis.		16	51		I. Tr. In.		7	46		I. Tr. In.		7	46		I. Tr. In.
	22	16		III. Sh. Eg.		17	53		I. Sh. Eg.		10	4		I. Tr. In.		10	4		I. Tr. In.
											11	50		IV. Oc. Re.		11	50		IV. Oc. Re.
											15	7		IV.* Oc. Re.		15	7		IV.* Oc. Re.

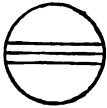
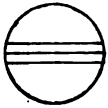
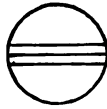
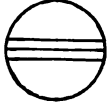
NOTE.—In. denotes ingress; Eg., egress; Dis., disappearance; Re., reappearance; Ec., eclipse.
Oc. denotes occultation; Tr., transit of the satellite; Sh., transit of the shadow; * Visible at Washington.

[Eph 15]

WASHINGTON MEAN TIME.

MAY.

Phases of the Eclipses of the Satellites for an Inverting Telescope.

* d		III.	* d	* r	
* d		IV.	* d	* r	

Configurations at 15^h 30^m for an Inverting Telescope.

West.			East.		
	I'	○	'2	'3	'4
		○ 2'	I'	3'	4'
'2	'1	○ 3'			4'
3'		○ 1'		4'	
3'		○	4' 2'		'1 ●
'3	2' 4' 1'	○			
4'	'2	○ '3 1'			
4'	I'	○	'2	'3	
4'		○ 2'	'1	3'	
'4	2' '1	○ 3'			
'4	3'	○ I'			'2 ●
'4 3'	'1	○	2'		
'3	2'	○			
'2	i	○ '1			'3 ●
I'		○	'2 4'	'3	
		○ '1	3'	4'	
2' I'		○ 3'		'4	
3'		○ I'		'4	'2 ●
3'	'1	○	2'	4'	
'3	2'	○ I'		4'	
'2		○	4'		'1 ● '3 ●
I'		○ 4' '2	'3		
4'		○ '1 2'	3'		
4'	2' I'	○ 3'			
4'		○ I'			
4'	3'	'1		'2	
'4	'3	○ I'			
'4	'2	'3			'1 ●
'4		○ '2	'3		
'4		○ '1 2'	'3		
2' I'		○ 4'	3'		

WASHINGTON MEAN TIME.

JUNE.

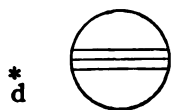
d	h	m	s		d	h	m	s		d	h	m	s		d	h	m	s	
1	3	36	52	I. Ec. Dis.	10	21	33		II. Tr. Eg.	21	7	49		II. Sh.	21	7	49		II. Sh.
	6	55		III. Sh. In.		22	39		I. Tr. In.		10	40		II. Tr.		10	40		II. Tr.
	7	13		I. Oc. Re.		23	34		I. Sh. Eg.		10	42		II. Sh.		10	42		II. Sh.
	10	16		III. Sh. Eg.	11	0	56		I. Tr. Eg.		12	6		I. Sh.		12	6		I. Sh.
	12	28		III. Tr. In.		18	28	4	I. Ec. Dis.		13	30		II.* Tr.		13	30		II.* Tr.
	15	35		III.* Tr. Eg.		22	7		I. Oc. Re.		13	30		I.* Tr.		13	30		I.* Tr.
	19	2	40	II. Ec. Dis.	12	1	2	45	III. Ec. Dis.		14	25		I.* Sh.		14	25		I.* Sh.
2	0	32		II. Oc. Re.		4	11	52	III. Ec. Re.		15	47		I.* Tr.		15	47		I.* Tr.
	0	54		I. Sh. In.		6	42		III. Oc. Dis.	22	9	19	17	I. Ec.		16	5		I. Ec.
	2	15		I. Tr. In.		9	44		III. Oc. Re.		12	58		I.* Oc.		17	1		I.* Oc.
	3	12		I. Sh. Eg.		10	54	46	II. Ec. Dis.		18	56		III. Sh.		18	56		III. Sh.
	4	32		I. Tr. Eg.		15	44		I.* Sh. In.		22	14		III. Sh.		22	14		III. Sh.
	22	5	22	I. Ec. Dis.		16	28		II. Oc. Re.	23	0	43		III. Tr.		23	0		III. Tr.
3	1	42		I. Oc. Re.		17	8		I. Tr. In.		2	46	36	II. Ec.		2	46		II. Ec.
	13	16		II. Sh. In.		18	3		I. Sh. Eg.		3	42		III. Tr.		3	42		III. Tr.
	16	2		II.* Tr. In.		19	25		I. Tr. Eg.		6	35		I. Sh.		6	35		I. Sh.
	16	9		II. Sh. Eg.	13	12	56	32	I. Ec. Dis.		7	58		I. Tr.		7	58		I. Tr.
	18	53		II. Tr. Eg.		16	35		I. Oc. Re.		8	19		II. Oc.		8	19		II. Oc.
	19	22		I. Sh. In.	14	5	12		II. Sh. In.		8	53		I. Sh.		9	1		I. Sh.
	20	44		I. Tr. In.		8	2		II. Tr. In.		10	16		I. Tr.		10	16		I. Tr.
	21	41		I. Sh. Eg.		8	5		II. Sh. Eg.	24	3	47	47	I. Ec.		11	1		I. Ec.
	23	1		I. Tr. Eg.		10	13		I. Sh. In.		7	26		I. Oc.		11	1		I. Oc.
4	16	33	56	I. Ec. Dis.		10	53		II. Tr. Eg.		21	7		II. Sh.		12	1		II. Sh.
	20	11		I. Oc. Re.		11	36		I. Tr. In.		23	58		II. Tr.		12	1		II. Tr.
	21	1	21	III. Ec. Dis.		12	31		I. Sh. Eg.	25	0	0		II. Sh.		12	1		II. Sh.
5	0	11	27	III. Ec. Re.		13	54		I.* Tr. Eg.		1	3		I. Sh.		13	1		I. Sh.
	2	34		III. Oc. Dis.	15	7	25	7	I. Ec. Dis.		2	27		I. Tr.		14	1		I. Tr.
	5	39		III. Oc. Re.		11	4		I. Oc. Re.		2	48		II. Tr.		14	1		II. Tr.
	8	20	3	II. Ec. Dis.		14	56		III.* Sh. In.		3	22		I. Sh.		15	1		I. Sh.
	13	50		I.* Sh. In.		18	14		III. Sh. Eg.		3	41		IV. Sh.		15	1		IV. Sh.
	13	51		II.* Oc. Re.		20	42		III. Tr. In.		4	44		I. Tr.		16	1		I. Tr.
	15	13		I.* Tr. In.		23	43		III. Tr. Eg.		7	33		IV. Sh.		16	1		IV. Sh.
	16	9		I. Sh. Eg.	16	0	12	4	II. Ec. Dis.		17	31		IV. Tr.		17	1		IV. Tr.
	17	30		I. Tr. Eg.		4	41		I. Sh. In.		20	8		IV. Tr.		18	1		IV. Tr.
6	11	2	24	I. Ec. Dis.		5	46		II. Oc. Re.		22	16	23	I. Ec.		18	1		I. Ec.
	14	40		I.* Oc. Re.		6	5		I. Tr. In.	26	1	55		I. Oc.		19	1		I. Oc.
7	2	34		II. Sh. In.		7	0		I. Sh. Eg.		9	4	32	III. Ec.		19	1		III. Ec.
	5	23		II. Tr. In.		8	22		I. Tr. Eg.		12	11	35	III.* Ec.		20	1		III.* Ec.
	5	28		II. Sh. Eg.		17	17	33	IV. Ec. Dis.		14	45		III.* Oc.		20	1		III.* Oc.
	8	14		II. Tr. Eg.		20	57	17	IV. Ec. Re.		16	3	52	II.* Ec.		21	1		II.* Ec.
	8	19		I. Sh. In.	17	1	53	37	I. Ec. Dis.		17	42		III. Oc.		21	1		III. Oc.
	9	42		I. Tr. In.		5	32		I. Oc. Re.		19	32		I. Sh.		22	1		I. Sh.
	10	38		I. Sh. Eg.		6	42		IV. Oc. Dis.		20	55		I. Tr.		22	1		I. Tr.
	11	59		I. Tr. Eg.		9	35		IV. Oc. Re.		21	36		II. Oc.		23	1		II. Oc.
8	5	30	59	I. Ec. Dis.		18	30		II. Sh. In.		21	50		I. Sh.		23	1		I. Sh.
	9	9		I. Oc. Re.		21	21		II. Tr. In.		23	12		I. Tr.		24	1		I. Tr.
	9	24		IV. Sh. In.		21	23		II. Sh. Eg.	27	16	44	51	I. Ec.		24	1		I. Ec.
	10	55		III. Sh. In.		23	10		I. Sh. In.		20	23		I. Oc.		25	1		I. Oc.
	13	24		IV.* Sh. Eg.	18	0	11		II. Tr. Eg.	28	10	26		II. Sh.		25	1		II. Sh.
	14	15		III.* Sh. Eg.		0	33		I. Tr. In.		13	16		II.* Tr.		26	1		II.* Tr.
	16	37		III. Tr. In.		1	28		I. Sh. Eg.		13	19		II.* Sh.		27	1		II.* Sh.
	19	41		III. Tr. Eg.		2	50		I. Tr. Eg.		14	0		I.* Sh.		28	1		I.* Sh.
	21	37	25	II. Ec. Dis.		20	22	12	I. Ec. Dis.		15	23		I.* Tr.		29	1		I.* Tr.
	23	0		IV. Tr. In.	19	0	1		I. Oc. Re.		16	6		II.* Tr.		30	1		II.* Tr.
9	2	4		IV. Tr. Eg.		5	3	36	III. Ec. Dis.		16	18		I. Sh.		30	1		I. Sh.
	2	47		I. Sh. In.		8	11	42	III. Ec. Re.		17	40		I. Tr.		31	1		I. Tr.
	3	10		II. Oc. Re.		10	45		III. Oc. Dis.		18	1		I. Ec.		31	1		I. Ec.
	4	10		I. Tr. In.		13	29	21	II.* Ec. Dis.	29	11	13	28	I.* Oc.		32	1		I.* Oc.
	5	6		I. Sh. Eg.		13	45		III.* Oc. Re.		22	57		III. Sh.		32	1		III. Sh.
	6	28		I. Tr. Dis.		17	38		I. Sh. In.	30	2	14		III. Tr.		33	1		III. Tr.
	23	59	29	I. Ec. Dis.		19	2		I. Tr. In.		4	40		II. Ec.		33	1		II. Ec.
10	3	38		I. Oc. Re.		19	3		II. Oc. Re.		5	21	4	III. Tr.		34	1		III. Tr.
	15	52		II.* Sh. In.		19	56		I. Sh. Eg.		7	36		I. Sh.		35	1		I. Sh.
	18	42		II. Tr. In.		21	19		I. Tr. Eg.		9	52		I. Tr.		36	1		I. Tr.
	18	46		II. Sh. Eg.	20	14	50	41	I.* Ec. Dis.		10	47		I. Sh.		37	1		I. Sh.
	21	16		I. Sh. In.		18	29		I. Oc. Re.		10	51		II. Oc.		38	1		II. Oc.

NOTE.—In. denotes ingress; Eg., egress; Dis., disappearance; Re., reappearance; Ec., eclipse.
Oc. denotes occultation; Tr., transit of the satellite; Sh., transit of the shadow; * Visible at Wad
[Eph 15]

WASHINGTON MEAN TIME.

JUNE.

Phases of the Eclipses of the Satellites for an Inverting Telescope.



III.



IV.



Configurations at 14^h 15^m for an Inverting Telescope.

West.		East.
	'2 ○	'1 '4
3'	'1 ○	'2 '4
'3	○ 2' 1'	'4
2' '3 '1	○	'4
	○ ^{1'} ₂ '3	4'
	○	2' '3 4' '1 ●
2' 1'	○	^{4'} ₃
'2	○ 3' 4' '1	
3' ^{4'} ₁	○	'2
^{4'} ₃	○ 2' 1'	
4' ^{8'} ₃ '1	○	
4'	○ ^{1'} ₃	'2 ●
'4	○	'1 ●
'4	2' 1' ○	'3
'4 '2	○ ^{8'} ₁	
3' 41'	○	'2
3'	○ '4 ^{8'} ₁	
'3 2' '1	○	'4
	○ '3 1'	'4 '2 ●
'1	○	'2 '3 '4
2'	○	3' 4'
'2	○ '1 3'	4'
3' 1'	○	^{8'} ₁ 4'
3'	○	'3 2' '1
4' '2 ^{8'} ₃	○	1'
4'	'1 ○	'2 '3
4'	○ 1'	3'
4'	○	3' '2
'4	3' 1' ○	'2

[Eph 15]

WASHINGTON MEAN TIME.

JULY.

d	h	m	s		d	h	m	s		d	h	m	s		d	h	m	s		
1	5	41	59	I. Ec. Dis.	11	1	22		III. Oc. Re.	20	19	51		IV. Oc. Re.	20	19	51		IV. Oc. Re.	
	9	19		I. Oc. Re.		1	37		I. Sh. Eg.		20	24		I. Oc. Re.		20	24		I. Oc. Re.	
	23	44		II. Sh. In.		2	35		II. Oc. Re.		21	11	0	III.* Sh. In.		21	11	0	III.* Sh. In.	
2	2	32		II. Tr. In.		2	54		I. Tr. Eg.		13	4	19	II.* Ec. Dis.		13	4	19	II.* Ec. Dis.	
	2	37		II. Sh. Eg.		20	33	19	I. Ec. Dis.		14	9		I.* Sh. In.		14	9		I.* Sh. In.	
	2	57		I. Sh. In.		21	58		IV. Sh. In.		14	13		III.* Sh. Eg.		14	13		III.* Sh. Eg.	
	4	19		I. Tr. In.	12	0	6		I. Oc. Re.		15	22		I.* Tr. In.		15	22		I.* Tr. In.	
	5	15		I. Sh. Eg.		1	41		IV. Sh. Eg.		16	3		III.* Tr. In.		16	3		III.* Tr. In.	
	5	22		II. Tr. Eg.		11	8		IV. Tr. In.		16	27		I. Sh. Eg.		16	27		I. Sh. Eg.	
	6	36		I. Tr. Eg.		13	15		IV.* Tr. Eg.		17	39		I. Tr. Eg.		17	39		I. Tr. Eg.	
3	0	10	35	I. Ec. Dis.		15	40		II.* Sh. In.		18	14		II. Oc. Re.		18	14		II. Oc. Re.	
	3	47		I. Oc. Re.		17	47		I. Sh. In.		18	54		III. Tr. Eg.		18	54		III. Tr. Eg.	
	11	32	12	IV. Ec. Dis.		18	21		II. Tr. In.	22	11	24	49	I.* Ec. Dis.		22	11	24	49	I.* Ec. Dis.
	13	5	6	III.* Ec. Dis.		18	33		II. Sh. Eg.		14	52		I.* Oc. Re.		14	52		I.* Oc. Re.	
	15	3	53	IV.* Ec. Re.		19	6		I. Tr. In.	23	7	36		II. Sh. In.		23	7	36		II. Sh. In.
	16	11	6	III. Ec. Re.		20	5		I. Sh. Eg.		8	38		I. Sh. In.		8	38		I. Sh. In.	
	18	38	18	II. Ec. Dis.		21	10		II. Tr. Eg.		9	49		I. Tr. In.		9	49		I. Tr. In.	
	18	39		III. Oc. Dis.		21	22		I. Tr. Eg.		10	3		II. Tr. In.		10	3		II. Tr. In.	
	21	25		I. Sh. In.	13	15	1	57	I.* Ec. Dis.		10	28		II.* Sh. Eg.		10	28		II.* Sh. Eg.	
	21	34		III. Oc. Re.		18	34		I. Oc. Re.		10	56		I.* Sh. Eg.		10	56		I.* Sh. Eg.	
	22	47		I. Tr. In.	14	6	59		III. Sh. In.		12	6		I.* Tr. Eg.		12	6		I.* Tr. Eg.	
	23	43		I. Sh. Eg.		10	13		III. Sh. Eg.		12	51		II.* Tr. Eg.		12	51		II.* Tr. Eg.	
4	0	6		II. Oc. Re.		10	29	54	II. Ec. Dis.	24	5	53	28	I. Ec. Dis.		24	5	53	28	I. Ec. Dis.
	0	46		IV. Oc. Dis.		12	16		I.* Sh. In.		9	19		I. Oc. Re.		9	19		I. Oc. Re.	
	1	4		I. Tr. Eg.		12	20		III.* Tr. In.	25	1	7	56	III. Ec. Dis.		25	1	7	56	III. Ec. Dis.
	3	12		IV. Oc. Re.		13	33		I.* Tr. In.		2	21	32	II. Ec. Dis.		2	21	32	II. Ec. Dis.	
	18	39	4	I. Ec. Dis.		14	34		I.* Sh. Eg.		3	6		I. Sh. In.		3	6		I. Sh. In.	
	22	15		I. Oc. Re.		15	12		III.* Tr. Eg.		4	10	36	III. Ec. Re.		4	10	36	III. Ec. Re.	
5	13	3		II.* Sh. In.		15	48		II.* Oc. Re.		4	16		I. Tr. In.		4	16		I. Tr. In.	
	15	50		II.* Tr. In.		15	50		I.* Tr. Eg.		5	24		I. Sh. Eg.		5	24		I. Sh. Eg.	
	15	54		I.* Sh. In.	15	9	30	29	I. Ec. Dis.		5	56		III. Oc. Dis.		5	56		III. Oc. Dis.	
	15	56		II.* Sh. Eg.		13	2		I.* Oc. Re.		6	33		I. Tr. Eg.		6	33		I. Tr. Eg.	
	17	15		I. Tr. In.	16	4	58		II. Sh. In.		7	25		II. Oc. Re.		7	25		II. Oc. Re.	
	18	12		I. Sh. Eg.		6	44		I. Sh. In.		8	45		III. Oc. Re.		8	45		III. Oc. Re.	
	18	39		II. Tr. Eg.		7	35		II. Tr. In.	26	0	21	59	I. Ec. Dis.		26	0	21	59	I. Ec. Dis.
	19	32		I. Tr. Eg.		7	51		II. Sh. Eg.		3	46		I. Oc. Re.		3	46		I. Oc. Re.	
6	13	7	41	I.* Ec. Dis.		8	0		I. Tr. In.		20	55		II. Sh. In.		20	55		II. Sh. In.	
	16	43		I. Oc. Re.		9	2		I. Sh. Eg.		21	35		I. Sh. In.		21	35		I. Sh. In.	
7	2	58		III. Sh. In.		10	17		I. Tr. Eg.		22	44		I. Tr. In.		22	44		I. Tr. In.	
	6	14		III. Sh. Eg.		10	24		II. Tr. Eg.		23	16		II. Tr. In.		23	16		II. Tr. In.	
	7	55	30	II. Ec. Dis.	17	3	59	7	I. Ec. Dis.		23	48		II. Sh. Eg.		23	48		II. Sh. Eg.	
	8	33		III. Tr. In.		7	29		I. Oc. Re.		23	52		I. Sh. Eg.		23	52		I. Sh. Eg.	
	10	22		I. Sh. In.		21	6	49	III. Ec. Dis.	27	1	0		I. Tr. Eg.		27	1	0	I. Tr. Eg.	
	11	27		III. Tr. Eg.		23	47	7	II. Ec. Dis.		2	5		II. Tr. Eg.		2	5		II. Tr. Eg.	
	11	43		I.* Tr. In.	18	0	10	37	III. Ec. Re.		18	50	39	I. Ec. Dis.		18	50	39	I. Ec. Dis.	
	12	40		I.* Sh. Eg.		1	12		I. Sh. In.		22	13		I. Oc. Re.		22	13		I. Oc. Re.	
	13	21		II.* Oc. Re.		2	15		III. Oc. Dis.	28	15	0		III.* Sh. In.		28	15	0	III.* Sh. In.	
	13	59		I.* Tr. Eg.		2	28		I. Tr. In.		15	38	46	II.* Ec. Dis.		15	38	46	II.* Ec. Dis.	
8	7	36	13	I. Ec. Dis.		3	30		I. Sh. Eg.		16	3		I.* Sh. In.		16	3		I.* Sh. In.	
	11	11		I. Oc. Re.		4	44		I. Tr. Eg.		16	14		IV.* Sh. In.		16	14		IV.* Sh. In.	
9	2	21		II. Sh. In.		5	1		II. Oc. Re.		17	10		I. Tr. In.		17	10		I. Tr. In.	
	4	50		I. Sh. In.		5	6		III. Oc. Re.		18	12		III. Sh. Eg.		18	12		III. Sh. Eg.	
	5	5		II. Tr. In.		22	27	37	I. Ec. Dis.		18	21		I. Sh. Eg.		18	21		I. Sh. Eg.	
	5	14		II. Sh. Eg.	19	1	57		I. Oc. Re.		19	27		I. Tr. In.		19	27		I. Tr. In.	
	6	10		I. Tr. In.		18	18		II. Sh. In.		19	50		III. Tr. In.		19	50		III. Tr. In.	
	7	9		I. Sh. Eg.		19	41		I. Sh. In.		20	37		IV. Sh. Eg.		20	37		IV. Sh. Eg.	
	7	54		II. Tr. Eg.		20	50		II. Tr. In.	29	3	43		III. Tr. In.		29	3	43	III. Tr. In.	
	8	27		I. Tr. Eg.		20	55		I. Tr. In.		3	54		IV. Tr. In.		3	54		IV. Tr. In.	
10	2	4	49	I. Ec. Dis.		21	10		II. Sh. Eg.		13	19	13	I.* Ec. Dis.		13	19	13	I.* Ec. Dis.	
	5	39		I. Oc. Re.		21	59		I. Sh. Eg.		16	40		I. Oc. Re.		16	40		I. Oc. Re.	
	17	5	44	III. Ec. Dis.		23	12		I. Tr. Eg.		16	14		II.* Sh. In.		16	14		II.* Sh. In.	
	20	10	38	III. Ec. Re.		23	38		II. Tr. Eg.		16	39		I.* Tr. In.		16	39		I.* Tr. In.	
	21	12	43	II. Ec. Dis.	20	5	47	23	IV. Ec. Dis.		12	49		II.* Tr. In.		12	49		II.* Tr. In.	
	22	29		III. Oc. Dis.		9	10	29	IV. Ec. Re.		13	6		I.* Sh. Eg.		13	6		I.* Sh. Eg.	
	23	19		I. Sh. In.		16	56	16	I. Ec. Dis.		13	54		I.* Tr. In.		13	54		I.* Tr. In.	
11	0	38		I. Tr. In.		17	52		IV. Oc. Dis.	31	7	47	53	I. Ec. Dis.		31	7	47	53	I. Ec. Dis.

NOTE.—In. denotes ingress; Eg., egress; Dis., disappearance; Re., reappearance; Ec., eclipse.

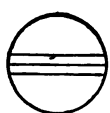
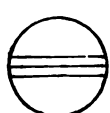
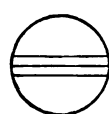
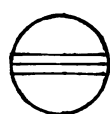
Oc. denotes occultation; Tr., transit of the satellite; Sh., transit of the shadow; * Visible at Washington.

[Eph 15]

WASHINGTON MEAN TIME.

JULY.

Phases of the Eclipses of the Satellites for an Inverting Telescope.

	<p>III.</p> <div style="display: flex; align-items: center; justify-content: center;"> <div style="text-align: center; margin-right: 10px;"> <p>* d</p> </div> <div style="text-align: center; margin-right: 10px;"> <p>* r</p> </div>  </div>
	<p>IV.</p> <div style="display: flex; align-items: center; justify-content: center;"> <div style="text-align: center; margin-right: 10px;"> <p>* d</p> </div> <div style="text-align: center; margin-right: 10px;"> <p>* r</p> </div>  </div>

Configurations at 13^h 30^m for an Inverting Telescope.

West.			East.		
'4	3°	○	'1	2°	
	'4'3	○			
	'2	○	1°		'3 ● '4 ●
	'1	○	'4	'3	
		○	2°'1°	'4'3	
	2°	○	3°	'4	'1 ●
		○	3°	'2	
	3°	○	'1	2°	'4
'3	'1'2	○		4°	
	'2'3	○	'1	4°	
	'1	○	'3'4	'2	
	4°	○	'1	'3	
4° 2°	'1	○	3°		
4°		○	1°		'2 ●
4°	3°	○	'1	2°	
	'3	○			
'4	'3	○	'1		
	'4	○	'3'2		
	'4	○	'1'2	'3	
	2° '1	○	3°		
		○	'1'2	'4	'2 ●
	3°	○	'2	'4	'1 ●
'3	'1'2	○		'4	
	'3	○	'1		'4
	1°	○	'3'2		4°
		○	1°'2°	'3	4°
	2° '1	○	3°'4°		
	'2	○	'1'2	4°	
	3° 4°	○	'2		'1 ●
1°	3°'4°	○			
4°	'3'2	○	'1		

WASHINGTON MEAN TIME.

AUGUST.

d	h	m	s		d	h	m	s		d	h	m	s		d	h	m	s	
1	4	56	0	II. Ec. Dis.	10	5	2		II. Sh. Eg.	20	18	7		II. Sh. In.					
	5	0		I. Sh. In.		6	50		II. Tr. Eg.		18	31		I. Sh. Eg.					
	5	9	43	III. Ec. Dis.		22	39	38	I. Ec. Dis.		19	11		I. Tr. Eg.					
	6	4		I. Tr. In.	11	1	47		I. Oc. Re.		19	31		II. Tr. In.					
	7	18		I. Sh. Eg.		19	51		I. Sh. In.		20	58		II. Sh. Eg.					
	8	11	16	III. Ec. Re.		20	44		I. Tr. In.		22	19		II. Tr. Eg.					
	8	20		I. Tr. Eg.		20	47	51	II. Ec. Dis.	21	13	31	37	I.* Ec. Dis.					
	9	32		III. Oc. Dis.		22	9		I. Sh. Eg.		16	26		I.* Oc. Re.					
	9	47		II. Oc. Re.		23	0		I. Tr. Eg.	22	10	42		I.* Sh. In.					
	12	20		III.* Oc. Re.		23	1		III. Sh. In.		11	21		I.* Tr. In.					
2	2	16	26	I. Ec. Dis.	12	1	16		II. Oc. Re.		12	39	57	II.* Ec. Dis.					
	5	34		I. Oc. Re.		2	12		III. Sh. Eg.		13	0		I.* Sh. Eg.					
	23	28		I. Sh. In.		2	42		III. Tr. In.		13	37		I.* Tr. Eg.					
	23	33		II. Sh. In.		5	29		III. Tr. Eg.		16	42		II.* Oc. Re.					
3	0	31		I. Tr. In.		17	8	14	I. Ec. Dis.		17	13	32	III. Ec. Dis.					
	1	40		II. Tr. In.		20	14		I. Oc. Re.		18	20	10	IV. Ec. Dis.					
	1	46		I. Sh. Eg.	13	14	19		I.* Sh. In.		21	23	36	IV. Ec. Re.					
	2	25		II. Sh. Eg.		15	10		I.* Tr. In.		22	39		III. Oc. Re.					
	2	47		I. Tr. Eg.		15	29		II.* Sh. In.		23	0	58	IV. Oc. Dis.					
	4	28		II. Tr. Eg.		16	37		I.* Sh. Eg.		2	30		IV. Oc. Re.					
	20	45	6	I. Ec. Dis.		17	12		II. Tr. In.		8	0	14	I. Ec. Dis.					
4	0	1		I. Oc. Re.		17	26		I. Tr. Eg.		10	52		I.* Oc. Re.					
	17	57		I. Sh. In.		18	21		II. Sh. Eg.	24	5	10		I. Sh. In.					
	18	13	16	II. Ec. Dis.		20	0		II. Tr. Eg.		5	47		I. Tr. In.					
	18	57		I. Tr. In.	14	10	32		IV.* Sh. In.		7	26		II. Sh. In.					
	19	0		III. Sh. In.		11	36	57	I.* Ec. Dis.		7	28		I. Sh. Eg.					
	20	15		I. Sh. Eg.		13	59		IV.* Sh. Eg.		8	3		I. Tr. In.					
	21	14		I. Tr. Eg.		14	40		I.* Oc. Re.		8	41		II.* Tr. In.					
	22	12		III. Sh. Eg.		19	14		IV. Tr. In.		10	18		II.* Sh. Eg.					
	22	58		II. Oc. Re.		20	41		IV. Tr. Eg.		11	28		II.* Tr. Eg.					
	23	14		III. Tr. In.	15	8	48		I. Sh. In.	25	2	28	58	I. Ec. Dis.					
5	2	1		III. Tr. Eg.		9	36		I.* Tr. In.		5	18		I. Oc. Re.					
	15	13	41	I.* Ec. Dis.		10	5	11	II.* Ec. Dis.		23	39		I. Sh. In.					
	18	28		I. Oc. Re.		11	6		I.* Sh. Eg.	26	0	13		I. Tr. In.					
6	0	3	9	IV. Ec. Dis.		11	52		I.* Tr. Eg.		1	56		I. Sh. Eg.					
	3	16	44	IV. Ec. Re.		13	12	24	III.* Ec. Dis.		1	57	24	II. Ec. Dis.					
	9	55		IV.* Oc. Dis.		14	25		II.* Oc. Re.		2	29		I. Tr. Eg.					
	11	34		IV.* Oc. Re.		16	11	37	III.* Ec. Re.		5	49		II. Oc. Re.					
	12	25		I.* Sh. In.		16	30		III.* Oc. Dis.		7	4		III. Sh. In.					
	12	51		II.* Sh. In.		19	16		III.* Oc. Re.		10	12		III.* Sh. Eg.					
	13	24		I.* Tr. In.	16	6	5	32	I. Ec. Dis.		12	14		III.* Tr. Eg.					
	14	43		I.* Sh. Eg.		9	7		I.* Oc. Re.		20	57	38	I. Ec. Dis.					
	14	51		II.* Tr. In.	17	3	16		I. Sh. In.	27	18	7		I. Oc. Re.					
	15	40		I.* Tr. Eg.		4	2		I. Tr. In.		18	39		I. Sh. In.					
	15	43		II.* Sh. Eg.		4	48		II. Sh. In.		20	25		I. Sh. Eg.					
	17	39		II. Tr. Eg.		5	34		I. Sh. Eg.		20	44		II. Sh. In.					
7	9	42	23	I.* Ec. Dis.		5	34		I. Tr. Eg.		20	55		I. Tr. Eg.					
	12	54		I.* Oc. Re.		6	18		II. Tr. In.		21	49		II. Tr. In.					
8	6	54		I. Sh. In.		6	23		II. Sh. Eg.	28	23	36		II. Tr. Eg.					
	7	30	32	II. Ec. Dis.		7	40		II.* Tr. Eg.		0	36		II. Tr. Sh.					
	7	50		I. Tr. In.		9	10		I. Ec. Dis.		15	26	24	I.* Ec. Dis.					
	9	11	0	III. Ec. Dis.	18	0	34	15	I. Oc. Re.	29	12	36		I. Oc. Re.					
	9	12		I. Sh. Eg.		3	33		I. Sh. In.		13	5		I.* Tr. In.					
	10	7		I.* Tr. Eg.		21	45		I. Tr. In.		14	53		I.* Sh. Eg.					
	12	7		II.* Oc. Re.		22	29		II. Ec. Dis.		15	14	52	II.* Ec. Dis.					
	12	11	24	III.* Ec. Re.		23	22	34	I. Tr. In.		18	56		I.* Tr. Re.					
	13	3		III.* Oc. Dis.	19	0	2		I. Sh. Eg.	30	21	14	48	III. Ec. Dis.					
	15	50		III.* Oc. Re.		0	45		I. Tr. Eg.		9	55	2	I.* Ec. Dis.					
9	4	10	56	I. Ec. Dis.		3	2		III. Sh. In.	31	12	37		I.* Oc. Re.					
	7	21		I. Oc. Re.		3	34		II. Oc. Re.		4	51		IV. Sh. In.					
10	1	22		I. Sh. In.		6	6		III. Tr. In.		7	4		I. Sh. In.					
	2	10		II. Sh. In.		6	12		III. Sh. Eg.		7	31		I. Tr. In.					
	2	17		I. Tr. In.		8	53		III.* Tr. Eg.		8	7		IV.* Sh. Eg.					
	3	40		I. Sh. Eg.		19	2	53	I. Ec. Dis.		9	22		I.* Sh. Eg.					
	4	2		II. Tr. In.		22	0		I. Oc. Re.		9	47		I.* Tr. Eg.					
	4	33		I. Tr. Eg.	20	16	13		I.* Sh. In.		9	47		IV.* Tr. In.					
						16	55		I. Tr. In.		10	4		II.* Sh. In.					
											10	58		II.* Tr. In.					
											11	17		IV.* Sh. Eg.					
											12	55		II.* Sh. Eg.					
											13	45		II.* Tr. Eg.					

NOTE.—In. denotes ingress; Eg., egress; Dis., disappearance; Re., reappearance; Ec., eclipse.
Oc. denotes occultation; Tr., transit of the satellite; Sh., transit of the shadow; * Visible at Washington.

[Eph 15]

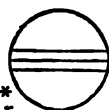
WASHINGTON MEAN TIME.

AUGUST.

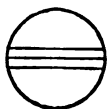
Phases of the Eclipses of the Satellites for an Inverting Telescope.



III.



IV.



Configurations at 12^h 45^m for an Inverting Telescope.

West.

East.

4°	1°	○ '3 '2	
'4		○	'12° '3
'4	'1	○	3°
'4	'2	○	1°3°
'43°	'1	○	'2
3°		○ 1°4°	
'3 2°		○	'4 '1 ●
	1° '3	○ '2	'4
		○	'1 2° '3 '4
	1°2°	○	3° '4
'2		○	1° 3° 4°
'1		○	'2 4°
3°		○	1°2° 4°
'3 2°		○	4° '1 ●
4°	1°	○ '3	'2 ●
4°		○	'1 '3
4°	1°2°	○	3°
'4	'2	○	'1 3°
'4	'13°	○	'2
'4 3°		○	1°2°
'4'3 2°	'1	○	
'4'3		○	'2 ●
		○	'1 4° '3
1° 2°		○	'4'3
'2		○	'1 3° '4
'1 3°		○	'2 '4
3°		○	1°2° 4°
'3 2°	'1	○	4°
'3 '2	1°	○	4°
		○	'1 '3 '2
1° 4°		○	'3

WASHINGTON MEAN TIME.

SEPTEMBER.

d	h	m	s		d	h	m	s		d	h	m	s		d	h	m	s	
1	4	23	48	I. Ec. Dis.	11	2	0		II. Sh. In.	20	17	53	2	I. Ec. Re.	20	17	53	2	I. Ec. Re.
	7	3		I. Oc. Re.		2	20		II. Tr. In.	21	12	41		I.* Tr. In.		12	41		I.* Tr. In.
2	1	33		I. Sh. In.		4	52		II. Sh. Eg.		12	48		I.* Sh. In.		12	48		I.* Sh. In.
	1	57		I. Tr. In.		5	8		II. Tr. Eg.		14	57		I.* Tr. Eg.		14	57		I.* Tr. Eg.
	3	50		I. Sh. Eg.		19	16	15	I. Ec. Dis.		15	5		I.* Sh. Eg.		15	5		I.* Sh. Eg.
	4	13		I. Tr. Eg.		21	39		I. Oc. Re.		17	42		II. Tr. In.		17	42		II. Tr. In.
	4	32	25	II. Ec. Dis.	12	16	25		I.* Sh. In.		17	58		II. Sh. In.		17	58		II. Sh. In.
	8	4		II.* Oc. Re.		16	32		I.* Tr. In.		20	31		II. Tr. Eg.		20	31		II. Tr. Eg.
	11	6		III.* Sh. In.		18	42		I. Sh. Eg.		20	48		II. Sh. Eg.		20	48		II. Sh. Eg.
	12	45		III.* Tr. In.		18	48		I. Tr. Eg.	22	9	58		I.* Oc. Dis.		9	58		I.* Oc. Dis.
	14	13		III.* Sh. Eg.		20	25	16	II. Ec. Dis.		12	21	51	I.* Ec. Re.		12	21	51	I.* Ec. Re.
	15	33		III.* Tr. Eg.		23	24		II. Oc. Re.	23	7	6		I.* Tr. In.		7	6		I.* Tr. In.
	22	52	29	I. Ec. Dis.	13	5	18	29	III. Ec. Dis.		7	16		I.* Sh. In.		7	16		I.* Sh. In.
3	1	29		I. Oc. Re.		8	33		III.* Oc. Re.		9	23		I.* Tr. Eg.		9	23		I.* Tr. Eg.
	20	2		I. Sh. In.		13	44	57	I.* Ec. Dis.		9	34		I.* Sh. Eg.		9	34		I.* Sh. Eg.
	20	22		I. Tr. In.		14	6	5	I.* Oc. Re.		11	55		II.* Oc. Dis.		11	55		II.* Oc. Dis.
	22	19		I. Sh. Eg.	14	10	53		I.* Sh. In.		15	3	15	II.* Ec. Re.		15	3	15	II.* Ec. Re.
	22	38		I. Tr. Eg.		10	57		I.* Tr. In.		22	29		III. Tr. In.		22	29		III. Tr. In.
	23	22		II. Sh. In.		13	11		I.* Sh. Eg.		23	10		III. Sh. In.		23	10		III. Sh. In.
4	0	5		II. Tr. In.		13	14		I.* Tr. Eg.	24	1	21		III. Tr. Eg.		1	21		III. Tr. Eg.
	2	14		II. Sh. Eg.		15	20		II.* Sh. In.		2	13		III. Sh. Eg.		2	13		III. Sh. Eg.
	2	52		II. Tr. Eg.		15	28		II.* Tr. In.		4	24		I. Oc. Dis.		4	24		I. Oc. Dis.
	17	21	16	I. Ec. Dis.		18	11		II. Sh. Eg.		6	50	35	I.* Ec. Re.		6	50	35	I.* Ec. Re.
	19	55		I. Oc. Re.		18	16		II. Tr. Eg.	25	1	32		I. Tr. In.		1	32		I. Tr. In.
5	14	30		I.* Sh. In.	15	8	13	46	I.* Ec. Dis.		1	45		I. Sh. In.		1	45		I. Sh. In.
	14	48		I.* Tr. In.		10	31		I.* Oc. Re.		3	49		I. Tr. Eg.		3	49		I. Tr. Eg.
	16	48		I.* Sh. Eg.	16	5	22		I. Sh. In.		4	2		I. Sh. Eg.		4	2		I. Sh. Eg.
	17	4		I. Tr. Eg.		5	23		I. Tr. In.		5	9		IV. Oc. Dis.		5	9		IV. Oc. Dis.
	17	49	59	II. Ec. Dis.		7	39		I.* Sh. Eg.		6	50		II.* Tr. In.		6	50		II.* Tr. In.
	21	11		II. Oc. Re.		7	39		I.* Tr. Eg.		7	16		II.* Sh. In.		7	16		II.* Sh. In.
6	1	16	37	III. Ec. Dis.		9	42		II.* Oc. Dis.		9	37	48	IV.* Ec. Re.		9	37	48	IV.* Ec. Re.
	5	16		III. Oc. Re.		12	30		II.* Oc. Re.		9	38		II.* Tr. Eg.		9	38		II.* Tr. Eg.
	11	49	56	I.* Ec. Dis.		19	8		III. Sh. In.		10	7		II.* Sh. Eg.		10	7		II.* Sh. Eg.
	14	21		I.* Oc. Re.		19	15		III. Tr. In.		22	50		I. Oc. Dis.		22	50		I. Oc. Dis.
7	8	59		I.* Sh. In.		22	5		III. Tr., Eg.	26	1	19	25	I. Ec. Re.		1	19	25	I. Ec. Re.
	9	14		I.* Tr. In.		22	13		III. Sh. Eg.		19	58		I. Tr. In.		19	58		I. Tr. In.
	11	16		I.* Sh. Eg.		23	11		IV. Sh. In.		20	14		I. Sh. In.		20	14		I. Sh. In.
	11	30		I.* Tr. Eg.		23	45		IV. Tr. In.		22	15		I. Tr. Eg.		22	15		I. Tr. Eg.
	12	42		II.* Sh. In.	17	1	35		IV. Tr. Eg.		22	31		I. Sh. Eg.		22	31		I. Sh. Eg.
	13	13		II.* Tr. In.		2	16		IV. Sh. Eg.	27	1	2		II. Oc. Dis.		1	2		II. Oc. Dis.
	15	33		II.* Sh. Eg.		2	40		I. Oc. Dis.		4	21	6	II. Ec. Re.		4	21	6	II. Ec. Re.
	16	1		II.* Tr. Eg.		4	56		I. Oc. Re.		12	14		III.* Oc. Dis.		12	14		III.* Oc. Dis.
8	6	18	44	I. Ec. Dis.		23	49		I. Tr. In.		16	15	0	III.* Ec. Re.		16	15	0	III.* Ec. Re.
	8	47		I.* Oc. Re.		23	50		I. Sh. In.		17	16		I. Oc. Dis.		17	16		I. Oc. Dis.
	12	38	19	IV.* Ec. Dis.	18	2	5		I. Tr. Eg.		19	48	8	I. Ec. Re.		19	48	8	I. Ec. Re.
	16	57		IV.* Oc. Re.		2	8		I. Sh. Eg.	28	14	24		I.* Tr. In.		14	24		I.* Tr. In.
9	3	27		I. Sh. In.		4	35		II. Tr. In.		14	43		I.* Sh. In.		14	43		I.* Sh. In.
	3	40		I. Tr. In.		4	38		II. Sh. In.		16	41		I. Tr. Eg.		16	41		I. Tr. Eg.
	5	45		I. Sh. Eg.		7	23		II.* Tr. In.		17	0		I. Sh. Eg.		17	0		I. Sh. Eg.
	5	56		I. Tr. Eg.		7	29		II.* Sh. Eg.		19	58		II. Tr. In.		19	58		II. Tr. In.
	7	7	36	II. Ec. Dis.		21	6		I. Oc. Dis.		20	36		II. Sh. In.		20	36		II. Sh. In.
	10	17		II.* Oc. Re.		23	24	21	I. Ec. Re.		22	47		II. Tr. Eg.		22	47		II. Tr. Eg.
	15	7		III.* Sh. In.	19	18	15		I. Tr. In.		23	26		II. Sh. Eg.		23	26		II. Sh. Eg.
	16	1		III.* Tr. In.		18	19		I. Sh. In.	29	11	42		I.* Oc. Dis.		11	42		I.* Oc. Dis.
	18	13		III. Sh. Eg.		20	31		I. Tr. Eg.		14	16	58	I.* Ec. Re.		14	16	58	I.* Ec. Re.
	18	49		III. Tr. Eg.		20	36		I. Sh. Eg.	30	8	50		I.* Tr. In.		8	50		I.* Tr. In.
10	0	47	26	I. Ec. Dis.		22	49		II. Oc. Dis.		9	11		I.* Sh. In.		9	11		I.* Sh. In.
	3	13		I. Oc. Re.	20	1	45	28	II. Ec. Re.		11	7		I.* Tr. Eg.		11	7		I.* Tr. Eg.
	21	56		I. Sh. In.		8	58		III.* Oc. Dis.		11	28		I.* Sh. Eg.		11	28		I.* Sh. Eg.
	22	6		I. Tr. In.		12	14	11	III.* Ec. Re.		14	9		II.* Oc. Dis.		14	9		II.* Oc. Dis.
11	0	13		I. Sh. Eg.		15	32		I.* Oc. Dis.		17	38	58	II. Ec. Re.		17	38	58	II. Ec. Re.
	0	22		I. Tr. Eg.															

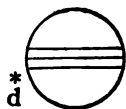
NOTE.—In. denotes ingress; Eg., egress; Dis., disappearance; Re., reappearance; Ec., eclipse.
Oc. denotes occultation; Tr., transit of the satellite; Sh., transit of the shadow; * Visible at Washington.

[Eph 15]

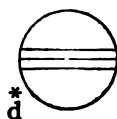
WASHINGTON MEAN TIME.

SEPTEMBER.

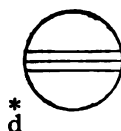
Phases of the Eclipses of the Satellites for an Inverting Telescope.



III.



IV.



Configurations at 12^h 0^m for an Inverting Telescope.

West.

East.

4' 2' ○ '1 3'

4' 1' ○₃ 2'

4' 3' ○ 1' 2'

4' '3 2' '1 ○

'4 '3 '2 ○ 1'

'4 ○ '3 '2 '1 ●

'4 1' ○ 2' '3

'2 '4 ○ '1 3'

1' ○₂ '4

3' ○ '1 2' '4

3' '1 ○ '4

'3 '2 ○ 1' '4

'1 ○ '3 '2 4'

○ 2' '3 4'

2' ○ '1 '4

1' ○₃ '2 ●

3' 4' ○ '1 2'

4' '12' ○

4' '3 '2 ○ 1'

4' '1 ○ '2 '3 ●

'4 ○ 1' 2' '3

'4 2' ○ 3' '1 ●

'4 1' ○ 3' '2 ●

'4 '3 ○ '1 2'

3' 1' 2' ○ '4

'3 '2 ○ 1' '4

'1 ○₃ '2 '4

○ 1' 2' '3 '4

2' ○ 3' 4' '1 ●

4' '1 ○ 3' 4'

WASHINGTON MEAN TIME.

OCTOBER.

d	h	m	s		d	h	m	s		d	h	m	s		d	h	m	s	
1	1	45		III. Tr. In.	11	5	32		II. Oc. Dis.	20	16	59		I. Oc.	20	16	59		I. Ec.
	3	12		III. Sh. In.		9	33	4	II.* Ec. Re.		20	2	51	I. Tr.		20	2	51	I.* Tr.
	4	39		III. Tr. Eg.		18	50		III. Oc. Dis.	21	14	6		I. Sh.		14	6		I. Tr.
	6	8		I. Oc. Dis.		19	20		IV. Oc. Dis.		14	56		I. Sh.		14	56		I. Sh.
	6	14		III.* Sh. Eg.		20	46		I. Oc. Dis.		16	23		I. Tr.		16	23		I. Tr.
	8	45	43	I.* Ec. Re.		21	50		IV. Oc. Re.		17	14		I. Sh.		17	14		I. Sh.
2	3	16		I. Tr. In.		23	38	36	I. Ec. Re.		20	59		II. Oc.		20	59		II. Ec.
	3	40		I. Sh. In.	12	0	16	37	III. Ec. Re.	22	1	27	37	I.* Oc.		1	27	37	I.* Oc.
	5	33		I. Tr. Eg.		1	18	28	IV. Ec. Dis.		11	25		III.* Tr.		11	25		III.* Tr.
	5	57		I. Sh. Eg.		3	45	23	IV. Ec. Re.		11	50		I.* Ec.		11	50		I.* Ec.
	9	5		II.* Tr. In.		17	53		I. Tr. In.		14	31	40	III. Tr.		14	31	40	III. Tr.
	9	54		II.* Sh. In.		18	33		I. Sh. In.		14	50		III. Sh.		14	50		III. Sh.
	11	54		II.* Tr. Eg.		20	10		I. Tr. Eg.		15	20		III. Sh.		15	20		III. Sh.
	12	45		II.* Sh. Eg.		20	50		I. Sh. Eg.		18	18		I.* Tr.		18	18		I.* Tr.
3	0	35		I. Oc. Dis.	13	0	31		II. Tr. In.	23	8	33		I.* Sh.		8	33		I.* Sh.
	3	14	35	I. Ec. Re.		1	52		II. Sh. In.		9	25		I.* Tr.		9	25		I.* Tr.
	13	42		IV.* Tr. In.		3	21		II. Tr. Eg.		10	50		I.* Sh.		10	50		I.* Sh.
	15	57		IV.* Tr. Eg.		4	42		II. Sh. Eg.		11	42		II. Tr.		11	42		II. Tr.
	17	33		IV. Sh. In.		15	12		I.* Oc. Dis.		16	1		I.* Oc.		16	1		I.* Oc.
	20	26		IV. Sh. Eg.		18	7	28	I. Ec. Re.		17	48		I. Sh.		17	48		I. Sh.
	21	42		I. Tr. In.	14	12	20		I.* Tr. In.		18	51		II. Tr.		18	51		II. Tr.
	22	9		I. Sh. In.		13	1		I.* Sh. In.		20	38		II. Sh.		20	38		II. Sh.
	23	59		I. Tr. Eg.		14	37		I.* Tr. Eg.	24	5	52		I.* Oc.		5	52		I.* Oc.
4	0	26		I. Sh. Eg.		15	18		I. Sh. Eg.		9	0	35	I.* Ec.		9	0	35	I.* Ec.
	3	16		II. Oc. Dis.		18	41		II. Oc. Dis.	25	3	0		I. Tr.		3	0		I. Tr.
	6	56	57	II.* Ec. Re.		22	51	9	II. Ec. Re.		3	54		I. Sh.		3	54		I. Sh.
	15	31		III.* Oc. Dis.	15	8	24		III.* Tr. In.		5	17		I. Tr.		5	17		I. Tr.
	19	1		I. Oc. Dis.		9	39		I.* Oc. Dis.		6	11		I.* Sh.		6	11		I.* Sh.
	20	15	56	III. Ec. Re.		11	17		III.* Sh. In.		10	9		II.* Oc.		10	9		II.* Oc.
	21	43	20	I. Ec. Re.		11	22		III.* Tr. Eg.		14	46	2	II. Ec.		14	46	2	II. Ec.
5	16	8		I. Tr. In.		12	36	16	I.* Ec. Re.	26	0	19		I. Oc.		0	19		I. Oc.
	16	38		I. Sh. In.		14	16		III.* Sh. Eg.		1	40		III. Oc.		1	40		III. Oc.
	18	25		I. Tr. Eg.	16	6	46		I.* Tr. In.		3	29	23	I. Ec.		3	29	23	I. Ec.
	18	55		I. Sh. Eg.		7	30		I.* Sh. In.		4	40		III. Oc.		4	40		III. Oc.
	22	14		II. Tr. In.		9	3		I.* Tr. Eg.		5	32	10	III. Ec.		5	32	10	III. Ec.
	23	14		II. Sh. In.		9	47		I.* Sh. Eg.		8	18	46	III.* Ec.		8	18	46	III.* Ec.
6	1	3		II. Tr. Eg.		13	41		II.* Tr. In.		21	26		I. Tr.		21	26		I. Tr.
	2	4		II. Sh. Eg.		15	10		II. Sh. In.		22	23		I. Sh.		22	23		I. Sh.
	13	27		I.* Oc. Dis.		16	30		II. Tr. Eg.		23	44		I. Tr.		23	44		I. Tr.
	16	12	10	I. Ec. Re.		18	0		II. Sh. Eg.	27	0	40		I. Sh.		0	40		I. Sh.
7	10	35		I.* Tr. In.	17	4	5		I. Oc. Dis.		5	12		II. Tr.		5	12		II. Tr.
	11	6		I.* Sh. In.		7	5	10	I.* Ec. Re.		7	7		II.* Sh.		7	7		II.* Sh.
	12	51		I.* Tr. Eg.	18	1	13		I. Tr. In.		8	2		II.* Tr.		8	2		II.* Tr.
	13	23		I.* Sh. Eg.		1	59		I. Sh. In.		9	57		II.* Sh.		9	57		II.* Sh.
	16	24		II. Oc. Dis.		3	30		I. Tr. Eg.		18	46		I. Oc.		18	46		I. Oc.
	20	14	56	II. Ec. Re.		4	16		I. Sh. Eg.		21	58	17	I. Ec.		21	58	17	I. Ec.
8	5	3		III. Tr. In.		7	50		II.* Oc. Dis.	28	10	14		IV.* Oc.		10	14		IV.* Oc.
	7	14		III.* Sh. In.		12	9	26	II.* Ec. Re.		13	5		IV.* Oc.		13	5		IV.* Oc.
	7	53		I.* Oc. Dis.		22	12		III. Oc. Dis.		15	54		I. Tr.		15	54		I. Tr.
	7	59		III.* Tr. Eg.		22	32		I. Oc. Dis.		16	52		I. Sh.		16	52		I. Sh.
	10	15		III.* Sh. Eg.	19	1	12		III. Oc. Re.		18	10		I. Tr.		18	10		I. Tr.
	10	40	57	I.* Ec. Re.		1	29	31	III. Ec. Dis.		19	9		I. Sh.		19	9		I. Sh.
9	5	1		I. Tr. In.		1	33	58	I. Ec. Re.		19	40	51	IV. Ec.		19	40	51	IV. Ec.
	5	35		I. Sh. In.		4	17	26	III. Ec. Re.		21	52	46	IV. Ec.		21	52	46	IV. Ec.
	7	18		I.* Tr. Eg.		19	39		I. Tr. In.	29	4	4	19	II. Ec.		4	4	19	II. Ec.
	7	52		I.* Sh. Eg.		20	28		I. Sh. In.		13	13		I.* Oc.		13	13		I.* Oc.
	11	22		II.* Tr. In.		21	56		I. Tr. Eg.		15	19		III. Tr.		15	19		III. Tr.
	12	32		II.* Sh. In.		22	45		I. Sh. Eg.		16	27	8	I. Ec.		16	27	8	I. Ec.
	14	12		II.* Tr. Eg.	20	2	51		II. Tr. In.		18	20		III. Tr.		18	20		III. Tr.
	15	22		II.* Sh. Eg.		4	9		IV. Tr. In.		22	19		III. Sh.		22	19		III. Sh.
10	2	20		I. Oc. Dis.		4	29		II. Sh. In.	30	10	21		I.* Tr.		10	21		I.* Tr.
	5	9	50	I. Ec. Re.		5	40		II. Tr. Eg.		11	21		I.* Sh.		11	21		I.* Sh.
	23	27		I. Tr. In.		6	49		IV.* Tr. Eg.		12	38		I.* Tr.		12	38		I.* Tr.
11	0	4		I. Sh. In.		7	19		II.* Sh. Eg.		13	38		I.* Sh.		13	38		I.* Sh.
	1	44		I. Tr. Eg.		11	55		IV.* Sh. In.		18	24		II. Tr.		18	24		II. Tr.
	2	21		I. Sh. Eg.		14	35		IV.* Sh. Eg.	31	21	14		II. Sh.		21	14		II. Sh.
											23	16		I.* Oc.		23	16		I.* Oc.
											10	58	3	I.* Ec.		10	58	3	I.* Ec.

Notes.—In. denotes ingress; Eg., egress; Dis., disappearance; Re., reappearance; Ec., eclipse.
Oc. denotes occultation; Tr., transit of the satellite; Sh., transit of the shadow; * Visible at Wash.

[Eph 14]

WASHINGTON MEAN TIME.

OCTOBER.

Phases of the Eclipses of the Satellites for an Inverting Telescope.

I.



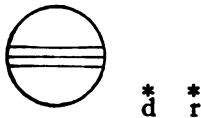
III.



II.



IV.



Configurations at 10^h 30^m for an Inverting Telescope.

Day.	West.			East.		
1			3°	○ 1°	2°	4°
2	○ 2°		3°	1°	○	4°
3		3°	2°	○ 4°	1°	
4			4°	1° 3°	○	2°
5		4°		○	1° 2° 3°	
6		4°	2°	1°	○	3°
7	4°		2°	○ 1°	3°	
8		4°	3°	○	2°	1° ●
9		4°	3°	1°	○ 2°	
10		3°	4°	2°	○	1°
11			1° 3°	○	2°	
12				○	1° 4° 3°	
13			2° 1°	○		3° 4°
14			2°	○ 1°	3°	4°
15	○ 3°			○	2°	4° 1° ●
16		3°	1°	○ 2°		4°
17		3°	2°	○	1°	4°
18			1° 3°	○		4° 2° ●
19				○	14° 3° 2°	
20			8° 1° 4°	○		3°
21		4°	2°	○ 1°	3°	
22		4°		1° 3°	2°	
23	○ 1°	4°	3°	○	2°	
24		4°	3° 2°	○	1°	
25		4°	3° 1°	○		2° ●
26		4°		○	3° 1° 2°	
27			4° 1° 2°	○		3°
28			2°	○	1°	3° 4° ●
29			1°	○	3° 2° 4°	
30	○ 1°		3°	○	2°	4°
31		3°	2°	○		4° 1° ●

WASHINGTON MEAN TIME.

NOVEMBER.

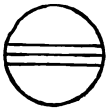
d	h	m	s				d	h	m	s				d	h	m	s					
1	4	48		I.	Tr.	In.	10	12	52		II.*	Tr.	Eg.	20	18	9		I.	Tr.	Eg.		
	5	50		I.*	Sh.	In.		15	12		II.*	Sh.	Eg.		19	24		I.	Sh.	In.		
	7	5		I.*	Tr.	Eg.		22	24		I.	Oc.	Dis.		21	1	45		II.	Tr.	In.	
	8	7		I.*	Sh.	Eg.		11	1	49	20	I.	Ec.	Re.		4	19		II.	Sh.	In.	
12	31			II.*	Oc.	Dis.		19	32		I.	Tr.	In.		4	36		II.	Tr.	Eg.		
17	22	53		II.	Ec.	Re.		20	43		I.	Sh.	In.		7	8		II.*	Sh.	Eg.		
2	2	7		I.	Oc.	Dis.		21	49		I.	Tr.	Eg.		13	12		I.	Ec.	Dis.		
	5	11		III.	Oc.	Dis.		23	0		I.	Sh.	Eg.		16	42	42	I.	Ec.	Re.		
	5	24	53	I.*	Ec.	Re.		12	4	8		II.	Oc.	Dis.		22	10	19	I.*	Tr.	In.	
	8	14		III.*	Oc.	Re.		9	18	24		II.*	Ec.	Re.		11	37		I.*	Sh.	In.	
	9	34	50	III.*	Ec.	Dis.		16	52		I.	Oc.	Dis.		12	0		IV.*	Tr.	In.		
	12	20	5	III.*	Ec.	Re.		20	18	11		I.	Ec.	Re.		12	37		I.	Tr.	Eg.	
	23	15		I.	Tr.	In.		22	32		III.	Tr.	In.		13	53		I.	Sh.	Eg.		
3	0	19		I.	Sh.	In.		13	1	36		III.	Tr.	Eg.		15	11		IV.	Tr.	Eg.	
	1	32		I.	Tr.	Eg.		3	27		III.	Sh.	In.		19	52		II.	Oc.	Dis.		
	2	35		I.	Sh.	Eg.		6	21		III.*	Sh.	Eg.		23	0	45	IV.	Sh.	In.		
	7	36		II.*	Tr.	In.		14	0		I.	Tr.	In.		1	14	44	II.	Ec.	Re.		
	9	45		II.*	Sh.	In.		15	12		I.	Sh.	In.		2	53		IV.	Sh.	Eg.		
	10	26		II.*	Tr.	Eg.		16	17		I.	Tr.	Eg.		7	40		I.*	Oc.	Dis.		
	12	34		II.*	Sh.	Eg.		17	29		I.	Sh.	Eg.		11	11	33	I.*	Ec.	Re.		
	20	35		I.	Oc.	Dis.		23	16		II.	Tr.	In.		16	18		III.	Oc.	Dis.		
	23	53	48	I.	Ec.	Re.		14	1	41		II.	Sh.	In.		19	24		III.	Ec.	Dis.	
4	17	42		I.	Tr.	In.		2	6		II.	Tr.	Eg.		21	43	35	III.	Ec.	Dis.		
	18	48		I.	Sh.	In.		2	9		IV.	Oc.	Dis.		24	0	24	46	III.	Ec.	Re.	
	19	59		I.	Tr.	Eg.		4	30		II.	Sh.	Eg.		4	48		I.	Tr.	In.		
	21	4		I.	Sh.	Eg.		5	15		IV.	Oc.	Re.		6	6		I.*	Sh.	In.		
5	1	43		II.	Oc.	Dis.		11	20		I.*	Oc.	Dis.		7	5		I.*	Tr.	Eg.		
	6	41	15	II.*	Ec.	Re.		14	4	44		IV.	Ec.	Dis.		8	22		I.*	Sh.	Eg.	
	15	2		I.	Oc.	Dis.		14	47	8		I.	Ec.	Re.		15	1		II.	Tr.	In.	
	18	22	38	I.	Ec.	Re.		15	59	27		IV.	Ec.	Re.		17	36		II.	Sh.	In.	
	18	53		III.	Tr.	In.		15	8	28		I.*	Tr.	In.		17	52		II.	Tr.	Eg.	
	19	32		IV.	Tr.	In.		9	41		I.*	Sh.	In.		20	26		II.	Sh.	Eg.		
	21	56		III.	Tr.	Eg.		10	45		I.*	Tr.	Eg.		25	2	8	I.	Oc.	Dis.		
	22	31		IV.	Tr.	Eg.		11	58		I.*	Sh.	Eg.		5	40	28	I.*	Ec.	Re.		
	23	24		III.	Sh.	In.		17	22		II.	Oc.	Dis.		23	16		I.	Tr.	In.		
6	2	20		III.	Sh.	Eg.		22	37	14		II.	Ec.	Re.		26	0	35	I.	Sh.	In.	
	6	19		IV.*	Sh.	In.		5	48		I.*	Oc.	Dis.		1	33		I.	Tr.	Eg.		
	8	44		IV.*	Sh.	Eg.		9	15	59		I.*	Ec.	Re.		2	51		I.	Sh.	Eg.	
	12	10		I.*	Tr.	In.		12	31		III.*	Oc.	Dis.		9	8		II.*	Oc.	Dis.		
	13	16		I.*	Sh.	In.		15	36		III.	Oc.	Re.		14	33	18	II.	Ec.	Dis.		
	14	27		I.	Tr.	Eg.		17	40	51		III.	Ec.	Dis.		20	36		I.	Oc.	Dis.	
	15	33		I.	Sh.	Eg.		20	23	24		III.	Ec.	Re.		27	0	9	20	I.	Ec.	In.
	20	48		II.	Tr.	In.		17	2	55		I.	Tr.	In.		6	6		III.*	Tr.	Eg.	
	23	4		II.	Sh.	In.		4	10		I.	Sh.	In.		9	13		III.*	Tr.	Eg.		
	23	39		II.	Tr.	Eg.		5	13		I.	Tr.	Eg.		11	33		III.*	Sh.	Eg.		
7	1	53		II.	Sh.	Eg.		6	26		I.*	Sh.	Eg.		14	24		III.	Tr.	Eg.		
	9	29		I.*	Oc.	Dis.		12	30		II.*	Tr.	In.		17	44		I.	Tr.	In.		
	12	51	35	I.*	Ec.	Re.		15	0		II.	Sh.	In.		19	4		I.	Sh.	Eg.		
	6	37		I.*	Tr.	In.		15	21		II.	Tr.	Eg.		20	2		I.	Tr.	Eg.		
	7	45		I.*	Sh.	In.		17	49		II.	Sh.	Eg.		21	20		I.	Sh.	Eg.		
	8	54		I.*	Tr.	Eg.		18	0	16		I.	Oc.	Dis.		23	4	17	II.	Tr.	In.	
	10	2		I.*	Sh.	Eg.		3	44	54		I.	Ec.	Re.		6	56		II.*	Sh.	Eg.	
	14	56		II.	Oc.	Dis.		21	23		I.	Tr.	In.		7	8		II.*	Tr.	Eg.		
	19	59	57	II.	Ec.	Re.		22	39		I.	Sh.	In.		9	45		II.*	Sh.	Dis.		
	3	57		I.	Oc.	Dis.		23	41		I.	Tr.	Eg.		15	5		I.	Oc.	Re.		
	7	20	25	I.*	Ec.	Re.		19	0	55		I.	Sh.	Eg.		18	38	17	I.	Ec.	In.	
	8	49		III.*	Oc.	Dis.		6	37		II.*	Oc.	Dis.		29	12	12	I.	Tr.	In.		
	11	52		III.*	Oc.	Re.		11	55	45		II.*	Ec.	Re.		13	32		I.	Sh.	Eg.	
	13	38	7	III.	Ec.	Dis.		18	44		I.	Oc.	Dis.		14	30		I.	Tr.	In.		
	16	22	2	III.	Ec.	Re.		22	13	45		I.	Ec.	Re.		15	49		I.	Sh.	Eg.	
10	1	4		I.	Tr.	In.		20	2	16		III.	Tr.	In.		22	24		II.	Sh.	Dis.	
	2	14		I.	Sh.	In.		5	22		III.*	Tr.	Eg.		3	52	25	II.*	Ec.	Dis.		
	3	22		I.	Tr.	Eg.		7	30		III.*	Sh.	In.		9	33	8	I.*	Oc.	Dis.		
	4	31		I.	Sh.	Eg.		10	23		III.*	Sh.	Eg.		13	7		IV.	Tr.	Eg.		
	10	2		II.*	Tr.	In.		15	51		I.	Tr.	In.		19	12		III.	Oc.	Dis.		
	12	23		II.*	Sh.	In.		17	8		I.	Sh.	In.		22	15		IV.	Tr.	Eg.		

NOTE.—In. denotes ingress; Eg., egress; Dis., disappearance; Re., reappearance; Ec., eclipse.
Oc. denotes occultation; Tr., transit of the satellite; Sh., transit of the shadow; * Visible at Washington.
[Eph 15]

WASHINGTON MEAN TIME.

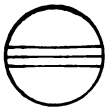
NOVEMBER.

Phases of the Eclipses of the Satellites for an Inverting Telescope.



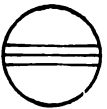
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III.



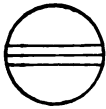
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IV.



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Configurations at 9^h 0^m for an Inverting Telescope.

West.

East.

'3 1¹/₂ ○

'4

○ '3 '1 '2 4'

1' ○ '3 4'

'2 ○ 1' 4' 3'

'1 ○ 4' 3' 2'

3' 4' ○ 1' 2'

4' 3' 2' 1' ○

4' '3 '2 1' ○

4' 1' '1 '2 '3 ●

'4 1' '2' '3

'4 '2 ○ '1 3'

'4 '1 ○ 3' '2 ●

'4 3' ○ 1' 2'

3' 2' '1 ○ '4

'3 '2 ○ '4

'3 ○ '2 '4 '1 ●

1' ○ 2' '3 '4

2' ○ '1 '3 4'

1' ○ 3' 4' '2 ●

3' ○ 1' 2' 4'

3' 1' ○ 4'

'3 '2 ○ 4' 1'

4' '3 ○ '2 '1 ●

4' 1' ○ 2' '3

4' 2' ○ '1 '3

'4 1' 2' ○ 3'

'4 1' 2' ○ 1' 2'

'4 3' '1 2' ○

3' 4' '2 ○ 1'

'3 4' '1 ○ '2

[Eph 13]

WASHINGTON MEAN TIME.

DECEMBER.

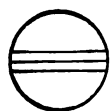
d	h	m	s		d	h	m	s		d	h	m	s	
1	1	46	3	III. Ec. Dis.	10	14	17		II. Oc. Dis.	20	17	59		I. Tr. In.
	4	25	51	III. Ec. Re.		19	48	56	II. Ec. Re.		19	20		I. Sh. In.
	6	41		I.* Tr. In.	11	0	25		I. Oc. Dis.		20	17		I. Tr. Eg.
	8	1		I.* Sh. In.		4	0	28	I. Ec. Re.		21	36		I. Sh. Eg.
	8	30	56	IV.* Ec. Dis.		14	2		III. Tr. In.	21	6	16		II.* Oc. Dis.
	8	58		I.* Tr. Eg.		17	9		III. Tr. Eg.		11	46	25	II. Ec. Re.
	10	5	12	IV.* Ec. Re.		19	39		III. Sh. In.		15	19		I. Oc. Dis.
	10	18		I.* Sh. Eg.		21	34		I. Tr. In.		18	53	47	I. Ec. Re.
	17	34		II. Tr. In.		22	28		III. Sh. Eg.	22	8	15		III.* Oc. Dis.
	20	15		II. Sh. In.		22	55		I. Sh. In.		11	22		III. Ec. Re.
	20	25		II. Tr. Eg.		23	51		I. Tr. Eg.		12	29		I. Tr. In.
	23	4		II. Sh. Eg.	12	1	11		I. Sh. Eg.		13	49		I. Sh. In.
2	4	2		I. Oc. Dis.		9	28		II.* Tr. In.		13	54	24	III. Ec. Dis.
	7	36	3	I.* Ec. Re.		12	11		II. Sh. In.		14	46		I. Tr. Eg.
3	1	10		I. Tr. In.		12	19		II. Tr. Eg.		16	5		I. Sh. Eg.
	2	30		I. Sh. In.		14	59		II. Sh. Eg.		16	30	0	III. Ec. Re.
	3	27		I. Tr. Eg.		18	54		I. Oc. Dis.	23	1	26		II. Tr. In.
	4	47		I. Sh. Eg.		22	29	24	I. Ec. Re.		4	6		II. Sh. In.
	11	41		II.* Oc. Dis.	13	16	3		I. Tr. In.		4	17		II. Tr. Eg.
	17	11	2	II. Ec. Re.		17	24		I. Sh. In.		6	54		II.* Sh. Eg.
	22	30		I. Oc. Dis.		18	20		I. Tr. Eg.		9	49		I.* Oc. Dis.
4	2	4	55	I. Ec. Re.		19	40		I. Sh. Eg.		13	22	40	I. Ec. Re.
	10	2		III.* Tr. In.	14	3	37		II. Oc. Dis.	24	6	58		I.* Tr. In.
	13	9		III. Tr. Eg.		9	8	16	II.* Ec. Re.		8	18		I.* Sh. In.
	15	36		III. Sh. In.		13	23		I. Oc. Dis.		9	15		I.* Tr. Eg.
	18	26		III. Sh. Eg.		16	58	16	I. Ec. Re.		10	34		I.* Sh. Eg.
	19	38		I. Tr. In.	15	4	9		III. Oc. Dis.		19	37		II. Ec. Dis.
	20	59		I. Sh. In.		7	16		III.* Oc. Re.	25	1	5	10	II. Ec. Re.
	21	56		I. Tr. Eg.		9	51	32	III.* Ec. Dis.		4	18		I. Oc. Dis.
	23	16		I. Sh. Eg.		10	32		I.* Tr. In.		7	51	31	I.* Ec. Re.
5	6	51		II.* Tr. In.		11	53		I. Sh. In.		22	14		III. Tr. In.
	9	34		II.* Sh. In.		12	28	34	III. Ec. Re.	26	0	13		IV. Tr. In.
	9	43		II.* Tr. Eg.		12	49		I. Tr. Eg.		1	21		III. Tr. Eg.
	12	22		II. Sh. Eg.		14	9		I. Sh. Eg.		1	27		I. Tr. In.
	16	59		I. Oc. Dis.		22	47		II. Tr. In.		2	47		I. Sh. In.
	20	33	51	I. Ec. Re.	16	1	29		II. Sh. In.		3	28		IV. Tr. Eg.
6	14	7		I. Tr. In.		1	38		II. Tr. Eg.		3	45		I. Tr. Eg.
	15	28		I. Sh. In.		4	17		II. Sh. Eg.		3	45		III. Sh. In.
	16	24		I. Tr. Eg.		7	52		I.* Oc. Dis.		5	3		I. Sh. Eg.
	17	44		I. Sh. Eg.		11	27	10	I. Ec. Re.		6	31		III.* Sh. Eg.
7	0	59		II. Oc. Dis.	17	5	1		I. Tr. In.		13	41		IV. Sh. In.
	6	30	16	II.* Ec. Re.		6	22		I.* Tr. In.		15	6		IV. Sh. Eg.
	11	27		I.* Oc. Dis.		7	18		I.* Tr. Eg.		17	24		II. Sh. In.
	15	2	43	I. Ec. Re.		8	38		I.* Sh. Eg.		17	37		II. Tr. Eg.
8	0	6		III. Oc. Dis.		13	16		IV. Oc. Dis.		20	12		II. Sh. Eg.
	3	14		III. Oc. Re.		16	32		IV. Oc. Re.		22	47		I. Oc. Dis.
	5	48	34	III.* Ec. Dis.		16	56		II. Oc. Dis.	27	2	20	26	I. Ec. Re.
	8	26	59	III.* Ec. Re.		22	26	59	II. Ec. Re.		19	57		I. Tr. In.
	8	36		I.* Tr. In.	18	2	21		I. Oc. Dis.		21	16		I. Sh. In.
	9	57		I.* Sh. In.		3	0	13	IV. Ec. Dis.		21	14		I. Sh. Eg.
	10	53		I.* Tr. Eg.		4	7	52	IV. Ec. Re.		23	32		I. Tr. In.
	12	14		I. Sh. Eg.		5	56	1	I.* Ec. Re.	28	8	58		II.* Oc. Dis.
	20	9		II. Tr. In.		18	6		III. Tr. In.		14	24	41	II. Ec. Re.
	22	52		II. Sh. In.		21	13		III. Tr. Eg.		17	17		I. Oc. Dis.
	23	1		II. Tr. Eg.		23	30		I. Tr. In.		20	49	16	I. Ec. Re.
9	1	40		II. Sh. Eg.		23	42		III. Sh. In.	29	12	26		III. Oc. Dis.
	5	36		IV.* Tr. In.	19	0	51		I. Sh. In.		14	26		I. Tr. In.
	5	56		I.* Oc. Dis.		1	47		I. Tr. Eg.		15	32		III. Oc. Re.
	8	52		IV.* Tr. Eg.		2	30		III. Sh. In.		15	45		I. Sh. In.
	9	31	37	I.* Ec. Re.		3	7		I. Sh. Eg.		16	44		I. Tr. Eg.
	19	11		IV. Sh. In.		12	6		II. Tr. In.	30	20	31	58	III. Ec. Dis.
10	21	1		IV. Sh. Eg.		14	48		II. Sh. In.		4	7		I. Ec. Re.
	3	5		I. Tr. In.		14	57		II. Tr. Eg.		6	43		II.* Sh. In.
	4	26		I. Sh. In.		17	36		II. Sh. Eg.		6	58		II.* Tr. Eg.
	5	22		I.* Tr. Eg.		20	50		I. Oc. Dis.		9	30		II.* Sh. Eg.
	6	42		I.* Sh. Eg.	20	0	24	56	I. Ec. Re.	31	8	56		I. Ec. Dis.
											10	14		I. Sh. In.
											11	13		I. Tr. Eg.
											12	30		I. Sh. Eg.
											22	20		II. Oc. Dis.

Norm.—In. denotes ingress; Eg., egress; Dis., disappearance; Re., reappearance; Ec., eclipse.
Oc. denotes occultation; Tr., transit of the satellite; Sh., transit of the shadow; * Visible at Washington.
[Eph 15]

WASHINGTON MEAN TIME.

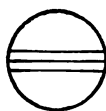
DECEMBER.

Phases of the Eclipses of the Satellites for an Inverting Telescope.

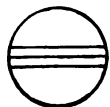


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III.

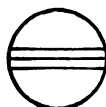


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IV.



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d *
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Configurations at 8^h o^m for an Inverting Telescope.

West.

East.

		○	³ 4.3	
	2'	○	'1	³ 4
	1' 2	○		3' 4
		○	3' '1 '2	'4
	3' '1	○		4'
	'3 '2	○	1'	4'
	'3 '1	○	'2	4'
		○	1' 2' 4'	'3 ●
1	2'	○		'3 '1 ●
	4' '21'	○	3'	
	4'	○	3' '1 '2	
	4' 3' 1'	○	2'	
	4' 3' '2	○	1'	
	'4 '3 '1	○		'2 ●
	'4	○	'31' 2'	
	'4 2'	○	'3	'1 ●
	'2 41'	○	3'	
		○	'13' ³ 4	
	3' 1'	○	2'	'4
	3' 2'	○	'1	'4
	'3 '1	○		'4 '2 ●
	'3	○	1' 2'	4'
	2' '1	○	'3	4'
	'2	○		3' 4'
		○	'1 ⁴ 4' ⁵ 4	
	³ 1.4'	○	2.	
	3' 4' 2'	○	'1	
	4' '3 '1 '2	○		
	4'	'3	○ 1' 2'	
	'4	'12'	○ '3	
.	'4	'2	○ 1'	'3

656 MAGNITUDE AND RINGS OF SATURN, 1915.

ELEMENTS FOR DETERMINING THE GEOCENTRIC POSITION, APPEARANCE,
AND MAGNITUDE OF SATURN'S RINGS.

Washington Mean Noon.	<i>a</i> Outer Major Axis.	<i>b</i> Outer Minor Axis.	<i>p</i> Inclination of Northern Semi-minor Axis to Circle of Declination from North to East.	<i>l</i> The elevation of the Earth above the Plane of the Rings.	<i>l'</i> The Elevation of the Sun above the Plane of the Rings.	Earth's Longitude from Saturn counted on Plane of Rings from the Rings Ascending Node on—		Stellar Mag.
						Equator.	Ecliptic.	
	"	"	° '	° '	° '	° '	° '	
Jan.	0 46.61	-20.82	-5 56.6	-26 32.1	-26 32.4	143 18.5	100 51.1	-0.3
	10 46.34	-20.76	5 52.6	26 37.4	26 31.0	142 27.0	99 59.7	0.3
	20 45.90	20.62	5 49.0	26 42.2	26 29.6	141 41.6	99 14.4	-0.1
	30 45.33	20.41	5 46.0	26 46.4	26 28.0	141 4.9	98 37.7	0.0
Feb.	9 44.65	20.15	5 43.9	26 49.9	26 26.4	140 38.8	98 11.6	0.0
	19 43.90	-19.85	-5 42.8	-26 52.8	-26 24.8	140 24.5	97 57.4	+0.1
Mar.	1 43.11	19.52	5 42.7	26 54.9	26 23.0	140 22.7	97 55.6	0.1
	11 42.31	19.17	5 43.7	26 56.2	26 21.2	140 33.5	98 6.5	0.1
	21 41.54	18.82	5 45.7	26 56.7	26 19.3	140 56.6	98 29.7	0.2
	31 40.80	18.48	5 48.6	26 56.3	26 17.4	141 31.2	99 4.4	0.3
Apr.	10 40.11	-18.16	-5 52.4	-26 55.0	-26 15.3	142 16.5	99 49.7	+0.3
	20 39.48	17.85	5 56.8	26 52.4	26 13.2	143 11.2	100 44.5	0.3
	30 38.93	17.56	6 1.8	26 48.8	26 11.0	144 14.2	101 47.5	0.3
May	10 38.46	17.30	6 7.0	26 43.8	26 8.8	145 24.2	102 57.5	0.3
	20 38.07	17.06	6 12.6	26 37.6	26 6.5	146 39.8	104 13.2	0.3
	30 37.77	-16.85	-6 18.2	-26 30.1	-26 4.1	147 59.9	105 33.3	+0.3
June	9 37.56	16.67	6 23.8	26 21.2	26 1.6	149 23.1	106 56.6	0.3
	19 37.43	16.52	6 29.3	26 11.2	25 59.1	150 48.3	108 21.9	0.2
	29 37.39	16.39	6 34.5	26 0.0	25 56.5	152 14.2	109 47.9	0.2
July	9 37.44	16.29	6 39.4	25 48.0	25 53.8	153 39.7	111 13.4	0.2
	19 37.58	-16.23	-6 43.9	-25 35.1	-25 51.1	155 3.6	112 37.4	+0.3
	29 37.81	16.20	6 48.1	25 21.9	25 48.3	156 24.9	113 58.7	0.3
Aug.	8 38.12	16.20	6 51.7	25 8.5	25 45.4	157 42.3	115 16.2	0.3
	18 38.52	16.23	6 54.9	24 55.2	25 42.5	158 54.7	116 28.7	0.4
	28 39.00	16.30	6 57.7	24 42.4	25 39.5	160 1.1	117 35.0	0.4
Sept.	7 39.56	-16.41	-7 0.0	-24 30.6	-25 36.4	161 0.2	118 34.2	+0.4
	17 40.19	16.56	7 1.8	24 20.1	25 33.2	161 51.1	119 25.2	0.4
	27 40.88	16.75	7 3.3	24 11.2	25 29.9	162 32.7	120 6.8	0.3
Oct.	7 41.63	16.98	7 4.3	24 4.6	25 26.6	163 4.0	120 38.2	0.3
	17 42.41	17.25	7 5.0	24 0.3	25 23.3	163 24.2	120 58.5	0.3
	27 43.20	-17.55	-7 5.2	-23 58.7	-25 19.9	163 32.9	121 7.2	+0.3
Nov.	6 43.98	17.88	7 5.2	23 59.9	25 16.4	163 29.5	121 3.9	0.2
	16 44.71	18.23	7 4.7	24 3.7	25 12.8	163 14.4	120 48.9	+0.1
	26 45.37	18.58	7 3.9	24 10.2	25 9.2	162 48.3	120 22.7	0.0
Dec.	6 45.92	18.91	7 2.7	24 18.9	25 5.5	162 12.2	119 46.7	-0.1
	16 46.33	-19.20	-7 1.1	-24 29.2	-25 1.7	161 28.0	119 2.6	-0.1
	26 46.58	19.45	6 59.3	24 40.6	24 57.9	160 38.1	118 12.7	0.2
	31 46.64	-19.55	-6 58.3	-24 46.5	-24 56.0	160 11.9	117 46.6	-0.3

The factor to be multiplied by *a* and *b* to obtain the axes of—

The inner ellipse of the outer ring = 0.8801, log factor = 9.9445

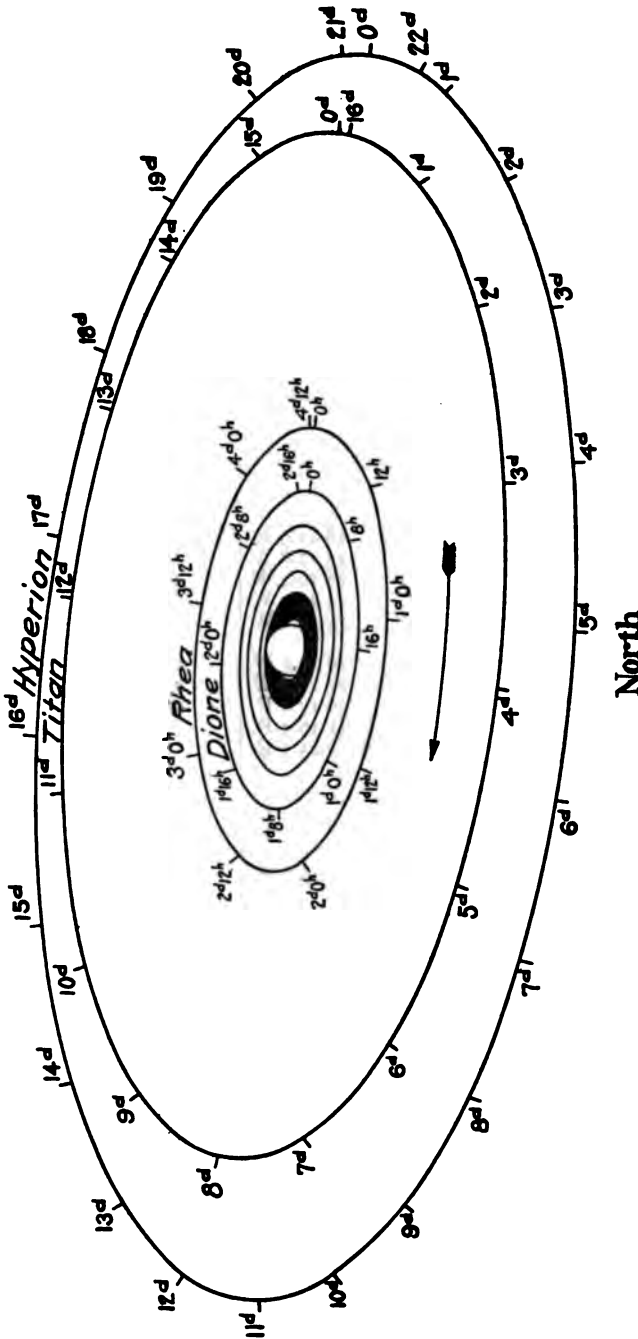
The outer ellipse of the inner ring = 0.8599, log factor = 9.9344

The inner ellipse of the inner ring = 0.6650, log factor = 9.8228

The inner ellipse of the dusky ring = 0.5486, log factor = 9.7392

NOTE.—The negative sign of *l* indicates that the visible surface of the rings is the southern one.

[Eph 15]



MEAN SYNODIC PERIODS.

	d	h
I.	0	22.6
II.	1	8.9
III.	1	21.3
IV.	2	17.7
V.	4	12.5
VI.	15	23.3
VII.	21	7.6
VIII.	79	22.1
IX.	533	15.6

APPARENT ORBITS OF THE SEVEN INNER SATELLITES OF SATURN,
AT DATE OF OPPOSITION, JANUARY 4, 1916,
AS SEEN IN AN INVERTING TELESCOPE.

NAMES OF THE SATELLITES.

- I. Minas.
- II. Enceladus.
- III. Tethys.
- IV. Dione.
- V. Rhea.
- VI. Titan.
- VII. Hyperion.
- VIII. Iapetus.
- IX. Phoebe.

WASHINGTON MEAN TIME OF GREATEST ELONGATION, ETC.

In the diagram on the preceding page, the points of the orbits marked "o" are those of the eastern elongation, as seen in an inverting telescope. The times of these elongations may be found from the following tables, and the apparent position of a satellite at any other time may be marked on the diagram by setting off on the proper orbit the elapsed interval in days and hours since the last eastern elongation. The orbits of the five inner satellites are regarded as circular and the time of any elongation not given in the tables may be readily found from those given by adding or subtracting the proper multiple of the mean synodic period. Mimas can be seen only within a few hours of each elongation, and the time of every elongation visible at Washington is given. For Titan, Hyperion and Iapetus the eccentricity is taken into account, and the times both of the elongations and of the conjunctions are given. The following abbreviations are used in the tables:

E., East Elongation.
W., West Elongation.

I., Inferior Conjunction (north of planet).
S., Superior Conjunction (south of planet).

MIMAS.

Greatest Elongations Visible at Washington.

Jan.	d h	Jan.	d h	Feb.	d h	Oct.	d h	Nov.	d h	Dec.	d h
1	15.6 W.	22	9.0 W.	16	8.4 E.	18	11.9 E.	18	14.2 E.	12	14.9 W.
2	14.2 W.	23	7.6 W.	17	7.0 E.	22	17.8 W.	19	12.8 E.	13	13.5 W.
3	12.8 W.	24	6.3 W.	20	14.1 W.	23	16.4 W.	20	11.4 E.	14	12.1 W.
4	11.4 W.	25	16.2 E.	21	12.7 W.	24	15.0 W.	21	10.0 E.	15	10.8 W.
5	10.0 W.	26	14.8 E.	22	11.3 W.	25	13.6 W.	22	8.6 E.	16	9.4 W.
6	8.6 W.	27	13.4 E.	23	10.0 W.	26	12.2 W.	24	17.3 W.	17	8.0 W.
7	7.2 W.	28	12.0 E.	24	8.6 W.	27	10.8 W.	25	15.9 W.	18	6.6 W.
8	5.8 W.	29	10.6 E.	25	7.2 W.	30	17.9 E.	26	14.5 W.	18	17.8 E.
8	17.1 E.	30	9.2 E.	Mar. 1	13.0 E.	31	16.5 E.	27	13.1 W.	19	16.4 E.
9	15.7 E.	31	7.8 E.	2	11.7 E.	Nov. 1	15.1 E.	28	11.7 W.	20	15.0 E.
10	14.3 E.	Feb. 1	6.5 E.	3	10.3 E.	2	13.7 E.	29	10.4 W.	21	13.6 E.
11	12.9 E.	3	15.0 W.	4	8.9 E.	3	12.3 E.	30	9.0 W.	22	12.2 E.
12	11.6 E.	4	13.6 W.	5	7.5 E.	4	11.0 E.	Dec. 1	17.4 E.	23	10.8 E.
13	10.2 E.	5	12.2 W.	9	13.2 W.	5	9.6 E.	3	16.0 E.	24	9.4 E.
14	8.8 E.	6	10.8 W.	10	11.9 W.	8	16.8 W.	4	14.6 E.	25	8.1 E.
15	7.4 E.	7	9.5 W.	11	10.5 W.	9	15.4 W.	5	13.2 E.	26	6.7 E.
16	6.0 E.	8	8.1 W.	12	9.1 W.	10	14.1 W.	6	11.8 E.	26	18.1 W.
17	16.0 W.	9	6.7 W.	13	7.7 W.	11	12.7 W.	7	10.4 E.	27	16.7 W.
18	14.6 W.	12	13.9 E.	Oct. 15	16.0 E.	12	11.3 W.	8	9.0 E.	28	15.3 W.
19	13.2 W.	13	12.5 E.	16	14.6 E.	13	9.9 W.	9	7.7 E.	29	13.9 W.
20	11.8 W.	14	11.1 E.	17	13.3 E.	16	16.9 E.	10	17.7 W.	30	12.5 W.
21	10.4 W.	15	9.8 E.			17	15.5 E.	11	16.3 W.	31	11.1 W.

ENCELADUS.

Jan.	d h	Jan.	d h	Jan.	d h	Feb.	d h	Feb.	d h	Mar.	d h
1	7.1 E.	14	23.9 E.	28	16.7 E.	11	9.5 E.	25	2.4 E.	10	19.3 E.
2	16.0 E.	16	8.8 E.	30	1.6 E.	12	18.4 E.	26	11.3 E.	12	4.4 E.
4	0.9 E.	17	17.6 E.	31	10.4 E.	14	3.3 E.	27	20.2 E.	13	13.1 E.
5	9.8 E.	19	2.5 E.	Feb. 1	19.3 E.	15	12.2 E.	Mar. 1	5.0 E.	14	22.0 E.
6	18.6 E.	20	11.4 E.	3	4.2 E.	16	21.0 E.	2	13.9 E.	16	6.8 E.
8	3.5 E.	21	20.3 E.	4	13.1 E.	18	5.9 E.	3	22.8 E.	17	15.7 E.
9	12.4 E.	23	5.2 E.	5	22.0 E.	19	14.8 E.	5	7.7 E.	19	0.6 E.
10	21.3 E.	24	14.0 E.	7	6.9 E.	20	23.7 E.	6	16.6 E.	20	9.5 E.
12	6.1 E.	25	22.9 E.	8	15.7 E.	22	8.6 E.	8	1.5 E.	21	18.4 E.
13	15.0 E.	27	7.8 E.	10	0.6 E.	23	17.5 E.	9	10.4 E.	23	3.3 E.

WASHINGTON MEAN TIME OF GREATEST ELONGATION.

ENCELADUS—(Concluded).

d h	Sept.	d h	Oct.	d h	Nov.	d h	Nov.	d h	Dec.
lar. 24 12.2 E.	21 11.0 E.	12 0.3 E.	13 0.3 E.	1 13.6 E.	22 2.8 E.	12 15.9 E.			
25 21.1 E.	22 19.9 E.	13 9.2 E.	13 9.2 E.	2 22.5 E.	23 11.7 E.	14 0.8 E.			
27 6.0 E.	24 4.8 E.	14 18.1 E.	14 18.1 E.	4 7.4 E.	24 20.5 E.	15 9.7 E.			
28 14.9 E.	25 13.7 E.	16 3.0 E.	16 3.0 E.	5 16.2 E.	26 5.4 E.	16 18.5 E.			
29 23.8 E.	26 22.6 E.	17 11.9 E.	17 11.9 E.	7 1.1 E.	27 14.3 E.	18 3.4 E.			
31 8.7 E.	28 7.4 E.	18 20.8 E.	18 20.8 E.	8 10.0 E.	28 23.2 E.	19 12.3 E.			
pr. 1 17.6 E.	29 16.3 E.	20 5.6 E.	20 5.6 E.	9 18.9 E.	30 8.0 E.	20 21.2 E.			
3 2.5 E.	Oct. 1 1.2 E.	21 14.5 E.	21 14.5 E.	11 3.8 E.	Dec. 1 16.9 E.	22 6.0 E.			
4 11.4 E.	2 10.1 E.	22 23.4 E.	22 23.4 E.	12 12.6 E.	3 1.8 E.	23 14.9 E.			
5 20.3 E.	3 19.0 E.	24 8.3 E.	24 8.3 E.	13 21.5 E.	4 10.7 E.	24 23.8 E.			
7 5.2 E.	5 3.9 E.	25 17.2 E.	25 17.2 E.	15 6.4 E.	5 19.5 E.	26 8.7 E.			
8 14.0 E.	6 12.8 E.	27 2.1 E.	27 2.1 E.	16 15.3 E.	7 4.4 E.	27 17.5 E.			
pt. 18 17.2 E.	7 21.7 E.	28 11.0 E.	28 11.0 E.	18 0.1 E.	8 13.3 E.	29 2.4 E.			
20 2.1 E.	9 6.6 E.	29 19.8 E.	29 19.8 E.	19 9.0 E.	9 22.2 E.	30 11.3 E.			
	10 15.4 E.	31 4.7 E.	31 4.7 E.	20 17.9 E.	11 7.0 E.	31 20.2 E.			

TETHYS.

d h	Feb.	d h	Mar.	d h	Sept.	d h	Oct.	d h	Nov.	d h	Dec.
a. 1 5.0 E.	6 1.6 E.	13 22.5 E.	13 22.5 E.	16 22.6 E.	22 19.5 E.	27 16.2 E.					
3 2.3 E.	7 22.9 E.	15 19.8 E.	15 19.8 E.	18 19.9 E.	24 16.8 E.	29 13.5 E.					
4 23.6 E.	9 20.2 E.	17 17.1 E.	17 17.1 E.	20 17.2 E.	26 14.1 E.	1 10.8 E.					
6 20.9 E.	11 17.5 E.	19 14.4 E.	19 14.4 E.	22 14.5 E.	28 11.4 E.	3 8.1 E.					
8 18.2 E.	13 14.8 E.	21 11.8 E.	21 11.8 E.	24 11.8 E.	30 8.7 E.	5 5.4 E.					
10 15.4 E.	15 12.1 E.	23 9.1 E.	23 9.1 E.	26 9.2 E.	Nov. 1 6.0 E.	7 2.6 E.					
12 12.7 E.	17 9.4 E.	25 6.4 E.	25 6.4 E.	28 6.5 E.	3 3.3 E.	8 23.9 E.					
14 10.0 E.	19 6.7 E.	27 3.7 E.	27 3.7 E.	30 3.8 E.	5 0.6 E.	10 21.2 E.					
16 7.3 E.	21 4.0 E.	29 1.1 E.	29 1.1 E.	Oct. 2 1.1 E.	6 21.9 E.	12 18.5 E.					
18 4.6 E.	23 1.3 E.	30 22.4 E.	30 22.4 E.	3 22.4 E.	8 19.2 E.	14 15.8 E.					
20 1.9 E.	24 22.6 E.	Apr. 1 19.7 E.	1 19.7 E.	5 19.7 E.	10 16.5 E.	16 13.1 E.					
21 23.2 E.	26 20.0 E.	3 17.0 E.	3 17.0 E.	7 17.0 E.	12 13.8 E.	18 10.4 E.					
23 20.5 E.	28 17.3 E.	5 14.4 E.	5 14.4 E.	9 14.4 E.	14 11.1 E.	20 7.6 E.					
25 17.8 E.	Mar. 2 14.6 E.	7 11.7 E.	7 11.7 E.	11 11.7 E.	16 8.4 E.	22 4.9 E.					
27 15.1 E.	4 11.9 E.	9 9.0 E.	9 9.0 E.	13 9.0 E.	18 5.7 E.	24 2.2 E.					
29 12.4 E.	6 9.2 E.	11 6.4 E.	11 6.4 E.	15 6.3 E.	20 3.0 E.	25 23.5 E.					
31 9.7 E.	8 6.5 E.	13 3.7 E.	13 3.7 E.	17 3.6 E.	22 0.3 E.	27 20.8 E.					
b. 2 7.0 E.	10 3.8 E.	15 1.0 E.	15 1.0 E.	19 0.9 E.	23 21.6 E.	29 18.1 E.					
4 4.3 E.	12 1.2 E.	...	...	20 22.2 E.	25 18.9 E.	31 15.4 E.					

DIONE.

d h	Feb.	d h	Mar.	d h	Sept.	d h	Oct.	d h	Nov.	d h	Dec.
n. 1 1.0 E.	5 14.5 E.	13 4.5 E.	13 4.5 E.	18 4.8 E.	23 18.9 E.	28 8.6 E.					
3 18.6 E.	8 8.2 E.	15 22.2 E.	15 22.2 E.	20 22.5 E.	26 12.6 E.	1 2.2 E.					
6 12.3 E.	11 1.8 E.	18 15.9 E.	18 15.9 E.	23 16.2 E.	29 6.2 E.	3 19.9 E.					
9 5.9 E.	13 19.5 E.	21 9.6 E.	21 9.6 E.	26 9.9 E.	31 23.9 E.	6 13.5 E.					
11 23.6 E.	16 13.2 E.	24 3.3 E.	24 3.3 E.	29 3.6 E.	Nov. 3 17.6 E.	9 7.2 E.					
14 17.2 E.	19 6.9 E.	26 21.0 E.	26 21.0 E.	Oct. 1 21.3 E.	6 11.3 E.	12 0.8 E.					
17 10.9 E.	22 0.6 E.	29 14.8 E.	29 14.8 E.	4 15.0 E.	9 4.9 E.	14 18.5 E.					
20 4.5 E.	24 18.2 E.	Apr. 1 8.5 E.	1 8.5 E.	7 8.8 E.	11 22.6 E.	17 12.1 E.					
22 22.2 E.	27 12.0 E.	4 2.2 E.	4 2.2 E.	10 2.4 E.	14 16.3 E.	20 5.8 E.					
25 15.8 E.	Mar. 2 5.6 E.	6 19.9 E.	6 19.9 E.	12 20.1 E.	17 9.9 E.	22 23.4 E.					
28 9.5 E.	4 23.3 E.	9 13.7 E.	9 13.7 E.	15 13.8 E.	20 3.6 E.	25 17.0 E.					
31 3.2 E.	7 17.0 E.	12 7.4 E.	12 7.4 E.	18 7.5 E.	22 21.3 E.	28 10.7 E.					
b. 2 20.8 E.	10 10.8 E.	...	...	21 1.2 E.	25 14.9 E.	31 4.3 E.					

WASHINGTON MEAN TIME OF GREATEST ELONGATION.

RHEA.		TITAN.		HYPERION.	
d	h	d	h	d	h
Jan. 2 12.8 E.	Sept. 26 7.6 E.	Jan. 2 23.9 E.	Oct. 5 21.5 I.	Jan. 1.3 W.	Sept. 7.9 I.
7 1.1 E.	30 20.1 E.	6 23.2 I.	9 19.9 W.	7.0 S.	13.8 W.
11 13.4 E.	Oct. 5 8.5 E.	10 20.1 W.	13 21.1 S.	11.7 E.	19.3 S.
16 1.7 E.	9 21.0 E.	14 19.4 S.	17 22.3 E.	16.5 I.	24.1 E.
20 14.0 E.	14 9.4 E.	18 21.3 E.	21 20.7 I.	22.4 W.	29.3 I.
25 2.4 E.	18 21.9 E.	22 20.7 I.	25 18.9 W.	28.2 S.	Oct. 5.1 W.
29 14.7 E.	23 10.3 E.	26 17.6 W.	29 20.0 S.	1.8 E.	10.6 S.
Feb. 3 3.1 E.	27 22.8 E.	30 16.9 S.	Nov. 2 21.1 E.	6.7 I.	15.4 E.
7 15.4 E.	Nov. 1 11.2 E.	3 19.0 E.	6 19.3 I.	12.6 W.	20.6 I.
12 3.8 E.	5 23.6 E.	7 18.6 I.	10 17.4 W.	18.3 S.	26.4 W.
16 16.2 E.	10 11.9 E.	11 15.6 W.	14 18.3 S.	23.0 E.	31.9 S.
21 4.6 E.	15 0.3 E.	15 15.0 S.	18 19.3 E.	27.8 I.	Nov. 5.7 E.
25 17.1 E.	19 12.7 E.	19 17.2 E.	22 17.4 I.	5.7 W.	10.9 I.
Mar. 2 5.5 E.	24 1.0 E.	23 17.0 I.	26 15.4 W.	11.5 S.	16.8 W.
6 18.0 E.	28 13.4 E.	27 14.1 W.	30 16.2 S.	16.2 E.	22.2 S.
11 6.4 E.	Dec. 3 1.7 E.	Mar. 3 13.7 S.	Dec. 4 17.0 E.	21.1 I.	27.0 E.
15 18.9 E.	7 14.0 E.	7 16.0 E.	8 15.1 I.	27.0 W.	Dec. 2.3 I.
20 7.4 E.	12 2.4 E.	11 16.0 I.	12 13.0 W.	1.7 S.	8.0 W.
24 19.0 E.	16 14.7 E.	15 13.2 W.	16 13.6 S.	6.4 E.	13.4 S.
29 8.4 E.	21 3.0 E.	19 12.9 S.	20 14.4 E.	11.3 I.	18.2 E.
Apr. 2 20.9 E.	25 15.3 E.	23 15.4 E.	24 12.6 I.	27.2 W.	23.4 I.
.....	30 3.6 E.	.....	28 10.3 W.	.....	29.2 W.

IAPETUS.

d	d	d	d	d	d
Jan. 20.0 E.	Feb. 28.4 W.	Apr. 9.4 E.	Sept. 19.1 F.	Oct. 28.9 W.	Dec. 7.5 E.
Feb. 9.3 I.	Mar. 19.6 S.	.....	Oct. 9.8 I.	Nov. 17.1 S.	27.6 I.

NINTH SATELLITE OF SATURN.

DIFFERENTIAL COORDINATES OF PHOEBE FOR 1915.

Washington Mean Noon.	$a_{Ph.} - a_{Sat.}$	$\delta_{Ph.} - \delta_{Sat.}$	Washington Mean Noon.	$a_{Ph.} - a_{Sat.}$	$\delta_{Ph.} - \delta_{Sat.}$	Washington Mean Noon.	$a_{Ph.} - a_{Sat.}$	$\delta_{Ph.} - \delta_{Sat.}$
m s	' "	' "	m s	' "	' "	m s	' "	' "
Jan. 1	-2 25.4	-2 11	Apr. 7	-1 4.1	-3 2	Sept. 30	+2 9.7	-0 36
5	2 26.1	2 25	11	0 56.8	2 54	Oct. 4	2 8.0	0 30
9	2 26.5	2 38	15	0 49.4	2 45	8	2 6.0	0 23
13	2 26.5	2 50	19	0 41.8	2 36	12	2 3.8	0 15
17	2 26.2	3 2	23	0 34.1	2 27	16	2 1.4	-0 6
21	2 25.4	3 12	27	0 26.3	2 19	20	1 58.9	+0 2
25	2 24.4	3 22	May 1	0 18.4	2 10	24	1 56.1	0 12
29	2 22.9	3 30	5	0 10.5	2 2	28	1 53.2	0 21
Feb. 2	2 21.1	3 38	9	-0 2.6	1 54	Nov. 1	1 50.1	0 31
6	2 18.9	3 44	13	+0 5.4	1 47	5	1 46.8	0 41
10	2 16.4	3 49	17	+0 13.2	-1 40	9	1 43.3	0 51
14	2 13.4	3 52	.....	.....	.....	13	1 39.7	1 1
18	2 10.1	3 54	Aug. 13	+2 9.2	-1 10	17	1 36.0	1 13
22	2 6.4	3 55	17	2 10.9	1 10	21	1 32.1	1 24
26	2 2.4	3 55	21	2 12.2	1 9	25	1 28.1	1 34
Mar. 2	1 58.0	3 54	25	2 13.3	1 8	29	1 24.0	1 44
6	1 53.3	3 52	29	2 14.0	1 7	Dec. 3	1 19.7	1 54
10	1 48.2	3 49	Sept. 2	2 14.5	1 5	7	1 15.4	2 4
14	1 42.8	3 44	6	2 14.6	1 3	11	1 10.9	2 13
18	1 37.0	3 39	10	2 14.5	1 0	15	1 6.3	2 22
22	1 31.0	3 33	14	2 14.1	0 57	19	1 1.7	2 30
26	1 24.6	3 26	18	2 13.4	0 53	23	0 56.9	2 38
30	1 18.0	3 19	22	2 12.4	0 48	27	0 52.1	2 45
Apr. 3	-1 11.2	-3 11	26	+2 11.2	-0 42	31	+0 47.1	+2 51

[Eph 15]

FRACTIONS OF THE PERIODS OF REVOLUTION.

Fraction of a Revolution.	Mimas.	Enceladus.	Tethys.	Dione.	Rhea.	Titan.	Fraction of a Revolution.
	h	d h	d h	d h	d h	d h	
0.00	0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0.00
0.02	0.5	0 0.7	0 0.9	0 1.3	0 2.2	0 7.7	0.02
0.04	0.9	0 1.3	0 1.8	0 2.6	0 4.3	0 15.3	0.04
0.06	1.4	0 2.0	0 2.7	0 3.9	0 6.5	0 23.0	0.06
0.08	1.8	0 2.6	0 3.6	0 5.3	0 8.7	1 6.6	0.08
0.10	2.3	0 3.3	0 4.5	0 6.6	0 10.8	1 14.3	0.10
0.12	2.7	0 4.0	0 5.4	0 7.9	0 13.0	1 21.9	0.12
0.14	3.2	0 4.6	0 6.3	0 9.2	0 15.2	2 5.6	0.14
0.16	3.6	0 5.3	0 7.2	0 10.5	0 17.3	2 13.2	0.16
0.18	4.1	0 5.9	0 8.2	0 11.8	0 19.5	2 20.9	0.18
0.20	4.5	0 6.6	0 9.1	0 13.1	0 21.7	3 4.5	0.20
0.22	5.0	0 7.2	0 10.0	0 14.5	0 23.9	3 12.2	0.22
0.24	5.4	0 7.9	0 10.9	0 15.8	1 2.0	3 19.8	0.24
0.26	5.9	0 8.6	0 11.8	0 17.1	1 4.2	4 3.5	0.26
0.28	6.3	0 9.2	0 12.7	0 18.4	1 6.4	4 11.2	0.28
0.30	6.8	0 9.9	0 13.6	0 19.7	1 8.5	4 18.8	0.30
0.32	7.2	0 10.5	0 14.5	0 21.0	1 10.7	5 2.5	0.32
0.34	7.7	0 11.2	0 15.4	0 22.3	1 12.9	5 10.1	0.34
0.36	8.1	0 11.8	0 16.3	0 23.6	1 15.0	5 17.8	0.36
0.38	8.6	0 12.5	0 17.2	1 1.0	1 17.2	6 1.4	0.38
0.40	9.0	0 13.2	0 18.1	1 2.3	1 19.4	6 9.1	0.40
0.42	9.5	0 13.8	0 19.0	1 3.6	1 21.5	6 16.7	0.42
0.44	10.0	0 14.5	0 19.9	1 4.9	1 23.7	7 0.4	0.44
0.46	10.4	0 15.1	0 20.8	1 6.2	2 1.9	7 8.0	0.46
0.48	10.9	0 15.8	0 21.7	1 7.5	2 4.0	7 15.7	0.48
0.50	11.3	0 16.4	0 22.7	1 8.8	2 6.2	7 23.3	0.50
0.52	11.8	0 17.1	0 23.6	1 10.2	2 8.4	8 7.0	0.52
0.54	12.2	0 17.8	1 0.5	1 11.5	2 10.5	8 14.7	0.54
0.56	12.7	0 18.4	1 1.4	1 12.8	2 12.7	8 22.3	0.56
0.58	13.1	0 19.1	1 2.3	1 14.1	2 14.9	9 6.0	0.58
0.60	13.6	0 19.7	1 3.2	1 15.4	2 17.1	9 13.6	0.60
0.62	14.0	0 20.4	1 4.1	1 16.7	2 19.2	9 21.3	0.62
0.64	14.5	0 21.0	1 5.0	1 18.0	2 21.4	10 4.9	0.64
0.66	14.9	0 21.7	1 5.9	1 19.4	2 23.6	10 12.6	0.66
0.68	15.4	0 22.4	1 6.8	1 20.7	3 1.7	10 20.2	0.68
0.70	15.8	0 23.0	1 7.7	1 22.0	3 3.9	11 3.9	0.70
0.72	16.3	0 23.7	1 8.6	1 23.3	3 6.1	11 11.5	0.72
0.74	16.7	1 0.3	1 9.5	2 0.6	3 8.2	11 19.2	0.74
0.76	17.2	1 1.0	1 10.4	2 1.9	3 10.4	12 2.8	0.76
0.78	17.6	1 1.7	1 11.3	2 3.2	3 12.6	12 10.5	0.78
0.80	18.1	1 2.3	1 12.2	2 4.5	3 14.7	12 18.2	0.80
0.82	18.5	1 3.0	1 13.2	2 5.9	3 16.9	13 1.8	0.82
0.84	19.0	1 3.6	1 14.1	2 7.2	3 19.1	13 9.5	0.84
0.86	19.5	1 4.3	1 15.0	2 8.5	3 21.2	13 17.1	0.86
0.88	19.9	1 4.9	1 15.9	2 9.8	3 23.4	14 0.8	0.88
0.90	20.4	1 5.6	1 16.8	2 11.1	4 1.6	14 8.4	0.90
0.92	20.8	1 6.3	1 17.7	2 12.4	4 3.7	14 16.1	0.92
0.94	21.3	1 6.9	1 18.6	2 13.7	4 5.9	14 23.7	0.94
0.96	21.7	1 7.6	1 19.5	2 15.1	4 8.1	15 7.4	0.96
0.98	22.2	1 8.2	1 20.4	2 16.4	4 10.3	15 15.0	0.98
1.00	22.6	1 8.9	1 21.3	2 17.7	4 12.4	15 22.7	1.00

[Eph 15]

Six Inner Satellites of Saturn.			Hyperion.			Iapetus.		
Fraction of a Revolution.	ρ^1	F	Time from Eastern Elongation.	ρ^1	F	Time from Eastern Elongation.	ρ^1	F
	.		d	.		d	.	
0.00	83.3	1.000	0.0	81.6	0.953	0	81.2	1.028
0.02	80.3	0.993	0.5	77.7	0.944	2	79.6	1.016
0.04	77.3	0.974	1.0	73.6	0.916	4	77.9	0.982
0.06	74.0	0.942	1.5	69.3	0.873	6	76.1	0.926
0.08	70.5	0.899	2.0	64.3	0.816	8	73.9	0.848
0.10	66.6	0.845	2.5	58.5	0.750	10	71.3	0.753
0.12	62.1	0.782	3.0	51.6	0.677	12	67.8	0.641
0.14	56.7	0.713	3.5	42.9	0.603	14	62.8	0.517
0.16	50.2	0.640	4.0	31.9	0.535	16	54.4	0.388
0.18	42.0	0.567	4.5	18.1	0.482	18	37.8	0.264
0.20	31.5	0.501	5.0	1.8	0.454	20	1.6	0.187
0.22	18.1	0.448	5.5	344.6	0.458	22	316.5	0.221
0.24	2.0	0.418	6.0	328.8	0.494	24	293.0	0.331
0.26	344.7	0.418	6.5	315.7	0.552	26	281.9	0.460
0.28	328.6	0.448	7.0	305.4	0.624	28	275.7	0.586
0.30	315.2	0.501	7.5	297.3	0.701	30	271.6	0.701
0.32	304.7	0.567	8.0	290.8	0.777	32	268.6	0.800
0.34	296.5	0.640	8.5	285.5	0.849	34	266.2	0.878
0.36	289.9	0.713	9.0	280.9	0.912	36	264.2	0.934
0.38	284.6	0.782	9.5	276.9	0.965	38	262.4	0.966
0.40	280.1	0.845	10.0	273.3	1.006	40	260.6	0.972
0.42	276.2	0.899	10.5	269.8	1.031	42	258.8	0.952
0.44	272.7	0.942	11.0	266.5	1.042	44	256.8	0.908
0.46	269.4	0.974	11.5	263.3	1.036	46	254.6	0.841
0.48	266.3	0.993	12.0	260.0	1.014	48	252.0	0.753
0.50	263.3	1.000	12.5	256.4	0.976	50	248.5	0.647
0.52	260.3	0.993	13.0	252.4	0.921	52	243.6	0.527
0.54	257.3	0.974	13.5	247.9	0.851	54	235.6	0.400
0.56	254.0	0.942	14.0	242.5	0.768	56	220.5	0.279
0.58	250.5	0.899	14.5	235.7	0.676	58	187.7	0.194
0.60	246.6	0.845	15.0	226.7	0.580	60	142.6	0.212
0.62	242.1	0.782	15.5	214.1	0.489	62	116.6	0.314
0.64	236.7	0.713	16.0	196.7	0.419	64	104.3	0.440
0.66	230.2	0.640	16.5	174.6	0.390	66	97.6	0.566
0.68	222.0	0.567	17.0	152.0	0.411	68	93.2	0.684
0.70	211.5	0.501	17.5	133.7	0.475	70	90.1	0.789
0.72	198.1	0.448	18.0	120.4	0.562	72	87.7	0.878
0.74	182.0	0.418	18.5	110.8	0.655	74	85.7	0.947
0.76	164.7	0.418	19.0	103.5	0.743	76	83.9	0.996
0.78	148.6	0.448	19.5	97.7	0.820	78	82.3	1.023
0.80	135.2	0.501	20.0	92.8	0.881	80	80.7	1.026
0.82	124.7	0.567	20.5	88.5	0.924			
0.84	116.5	0.640	21.0	84.5	0.948			
0.86	100.9	0.713	21.5	80.6	0.953			
0.88	104.6	0.782						
0.90	100.1	0.845						
0.92	96.2	0.899						
0.94	92.7	0.942						
0.96	89.4	0.974						
0.98	86.3	0.993						
1.00	83.3	1.000						

The fraction of a revolution is reckoned from the Eastern Elongation.

Position angle of satellite $\rho = \rho^1 + (P - P_0)$.

Apparent distance of satellite $s = F \frac{\rho^1(\rho)}{\rho}$.

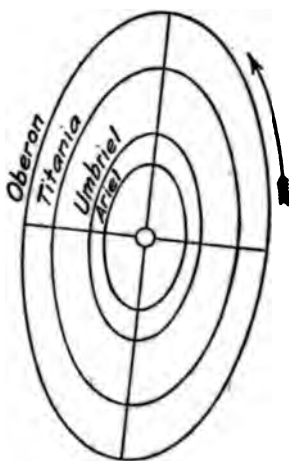
[Eph 15]

Date.	Mimas.		Enceladus.		Tethys.		Dione.	
	$P-P_0$	$\frac{a(p)}{p}$	$P-P_0$	$\frac{a(p)}{p}$	$P-P_0$	$\frac{a(p)}{p}$	$P-P_0$	$\frac{a(p)}{p}$
n. 0	•	"	•	"	•	"	•	"
10	+0.3	31.8	+0.7	40.8	-0.1	50.5	+0.7	64.7
20	0.7	31.6	0.8	40.6	0.0	50.2	0.8	64.3
30	1.0	31.3	0.8	40.2	0.0	49.7	0.9	63.7
b. 9	1.4	30.9	0.9	39.7	+0.1	49.1	0.9	62.9
19	1.7	30.4	0.9	39.1	0.2	48.3	1.0	62.0
19	+2.0	29.9	+1.0	38.4	+0.2	47.5	+1.0	60.9
11	2.2	29.4	0.9	37.7	0.2	46.7	1.0	59.8
11	2.4	28.8	0.9	37.0	0.3	45.8	0.9	58.7
21	2.5	28.3	0.9	36.4	0.3	45.0	0.9	57.6
31	2.6	27.8	0.8	35.7	0.3	44.2	0.9	56.6
10	+2.6	27.3	+0.8	35.1	+0.3	43.4	+0.8	55.7
17	-2.1	27.4	-0.3	35.2	+0.1	43.5	-0.4	55.8
27	-2.2	27.9	-0.4	35.8	+0.1	44.3	-0.4	56.7
7	2.1	28.4	0.4	36.4	0.2	45.1	0.4	57.8
17	2.0	28.9	0.4	37.1	0.2	45.9	0.5	58.9
27	1.8	29.4	0.4	37.8	0.2	46.8	0.5	59.9
6	1.6	30.0	0.4	38.5	0.3	47.6	0.5	61.0
16	-1.3	30.5	-0.4	39.1	+0.3	48.4	-0.5	62.0
26	1.1	30.9	0.4	39.7	0.3	49.1	0.4	63.0
6	0.8	31.3	0.4	40.2	0.4	49.7	0.4	63.7
16	0.5	31.6	0.4	40.6	0.4	50.2	0.4	64.3
26	-0.2	31.7	-0.3	40.8	+0.5	50.4	-0.4	64.6

Date.	Rhea.		Titan.		Hyperion.		Iapetus.	
	$P-P_0$	$\frac{a(p)}{p}$	$P-P_0$	$\frac{a(p)}{p}$	$P-P_0$	$\frac{a(p)}{p}$	$P-P_0$	$\frac{a(p)}{p}$
n. 0	•	"	•	"	•	"	•	"
10	+1.1	90.4	+0.9	209	+1.0	253	-3.0	610
20	1.1	89.8	1.0	208	1.1	252	3.2	606
30	1.2	89.0	1.0	206	1.2	250	3.3	601
b. 9	1.3	87.9	1.1	204	1.2	247	3.4	593
19	1.3	86.5	1.1	201	1.2	243	3.4	584
19	+1.3	85.1	+1.1	197	+1.3	239	-3.5	574
11	1.3	83.6	1.1	194	1.3	235	3.5	564
11	1.3	82.0	1.1	190	1.2	230	3.4	554
21	1.3	80.5	1.1	187	1.2	226	3.4	544
31	1.2	79.1	1.0	183	1.2	222	3.3	534
10	+1.2	77.7	+1.0	180	+1.1	218	-3.2	525
17	-0.1	77.9	-0.1	181	-0.1	219	+0.4	526
27	-0.1	79.3	-0.1	184	-0.1	222	+0.6	535
7	0.1	80.7	0.1	187	0.1	226	0.7	545
17	0.1	82.2	0.1	190	0.1	231	0.8	555
27	0.1	83.7	0.1	194	0.1	235	0.8	565
6	0.1	85.2	0.1	198	0.1	239	0.8	575
16	-0.1	86.7	-0.1	201	-0.1	243	+0.7	585
26	0.1	87.9	0.1	204	0.1	247	0.6	594
6	0.1	89.0	0.1	206	0.1	250	0.5	601
16	-0.1	89.8	-0.1	208	-0.1	252	0.4	606
26	0.0	90.3	0.0	209	0.0	253	+0.2	610

APPARENT ORBITS OF THE SATELLITES OF URANUS AT DATE OF OPPOSITION,
AUGUST 6, 1915, AS SEEN IN AN INVERTING TELESCOPE.

South



Apparent Apsides.

Date.	Position Angle.	App. Distances
		Ariel. Umbriel.
May 20,	352.2	13.5 18.7
Aug. 8,	353.0	14.0 19.5
Oct. 27,	353.8	13.4 18.7

Apparent Apsides.

Date.	Position Angle.	App. Distances
		Titania. Oberon.
May 20,	352.2	30.7 41.1
Aug. 8,	353.0	32.0 42.8
Oct. 27,	353.8	30.6 40.9

North

WASHINGTON MEAN TIME OF GREATEST ELONGATION.

ARIEL.		UMBRIEL.		TITANIA.		OBERON.
North.	South.	North.	South.	North.	South.	North and South.
d h	d h	d h	d h	d h	d h	d h
May 8 17.1	May 12 11.8	May 1 8.0	May 3 9.7	Apr. 29 7.8	May 3 16.2	May 19 9.0 N.
16 6.6	20 1.3	9 14.9	11 16.6	May 8 0.7	12 9.1	26 2.5 S.
23 20.0	27 14.8	17 21.8	19 23.5	16 17.6	21 2.1	June 1 20.1 N.
31 9.5	June 4 4.2	26 4.7	28 6.4	25 10.5	29 19.0	8 13.6 S.
June 7 22.9	11 17.7	June 3 11.6	June 5 13.3	June 3 3.5	June 7 11.9	15 7.2 N.
15 12.4	19 7.1	11 18.5	13 20.2	11 20.4	16 4.9	22 0.8 S.
23 1.8	26 20.6	20 1.4	22 3.2	20 13.4	24 21.8	28 18.4 N.
30 15.3	July 4 10.1	28 8.4	30 10.1	29 6.3	July 3 14.8	July 5 12.0 S.
July 8 4.8	11 23.5	July 6 15.3	July 8 17.0	July 7 23.3	12 7.8	12 5.6 N.
15 18.2	19 13.0	14 22.2	16 23.9	16 16.2	21 0.7	18 23.2 S.
23 7.7	27 2.5	23 5.1	25 6.9	25 9.2	29 17.7	25 16.8 N.
30 21.2	Aug. 3 16.0	31 12.1	Aug. 2 13.8	Aug. 3 2.2	Aug. 7 10.7	Aug. 1 10.4 S.
Aug. 7 10.7	11 5.4	Aug. 8 19.0	10 20.7	11 19.2	16 3.7	8 4.0 N.
15 0.2	18 18.9	17 2.0	19 3.7	20 12.2	24 20.7	14 21.6 S.
22 13.6	26 8.4	25 8.9	27 10.6	29 5.2	Sept. 2 13.6	21 15.2 N.
30 3.1	Sept. 2 21.9	Sept. 2 15.8	Sept. 4 17.6	Sept. 6 22.1	11 6.6	28 8.8 S.
Sept. 6 16.6	10 11.3	10 22.8	13 0.5	15 15.1	19 23.6	Sept. 4 2.4 N.
14 6.1	18 0.8	19 5.7	21 7.5	24 8.1	28 16.6	10 20.0 S.
21 19.6	25 14.3	27 12.7	29 14.4	Oct. 3 1.1	Oct. 7 9.6	17 13.6 N.
29 9.1	Oct. 3 3.8	Oct. 5 19.6	Oct. 7 21.4	11 18.0	16 2.5	24 7.2 S.
Oct. 6 22.6	10 17.3	14 2.6	16 4.3	20 11.0	24 19.5	Oct. 1 0.8 N.
14 12.0	18 6.8	22 9.5	24 11.2	29 4.0	Nov. 2 12.4	7 18.4 S.
22 1.5	25 20.3	30 16.4	Nov. 1 18.2	Nov. 6 20.9	11 5.4	14 12.0 N.
29 15.0	Nov. 2 9.8	Nov. 7 23.4	10 1.1	15 13.9	19 22.3	21 5.5 S.
Nov. 6 4.5	9 23.2	16 6.3	18 8.0	24 6.8	28 15.3	27 23.1 N.

For Ariel every third elongation is given, and for Umbriel every alternate one; the intermediate ones may be found by adding multiples of the period of the satellite. Sidereal Period of Ariel, $2^d 12^h .489$; of Umbriel, $4^d 3^h .460$; of Titania, $8^d 16^h .947$; of Oberon, $13^d 11^h .119$.

Fractions of the Period of Revolution.					Fraction of a Revolution.	ρ	F
Fraction of a Revolution.	Ariel.	Umbriel.	Titania.	Oberon.			
	d h	d h	d h	d h			
0.00	0 0.0	0 0.0	0 0.0	0 0.0	0.00	353.0	1.000
0.02	0 1.2	0 2.0	0 4.2	0 6.5	0.02	356.8	0.994
0.04	0 2.4	0 4.0	0 8.4	0 12.9	0.04	0.8	0.977
0.06	0 3.6	0 6.0	0 12.5	0 19.4	0.06	4.9	0.950
0.08	0 4.8	0 8.0	0 16.7	1 1.8	0.08	9.3	0.913
0.10	0 6.0	0 10.0	0 20.9	1 8.3	0.10	14.2	0.868
0.12	0 7.3	0 11.9	1 1.1	1 14.8	0.12	19.6	0.815
0.14	0 8.5	0 13.9	1 5.3	1 21.2	0.14	25.7	0.758
0.16	0 9.7	0 15.9	1 9.4	2 3.7	0.16	33.0	0.700
0.18	0 10.9	0 17.9	1 13.6	2 10.2	0.18	41.6	0.644
0.20	0 12.1	0 19.9	1 17.8	2 16.6	0.20	51.6	0.594
0.22	0 13.3	0 21.9	1 22.0	2 23.1	0.22	63.3	0.556
0.24	0 14.5	0 23.9	2 2.1	3 5.5	0.24	76.3	0.536
0.26	0 15.7	1 1.9	2 6.3	3 12.0	0.26	89.7	0.536
0.28	0 16.9	1 3.8	2 10.5	3 18.5	0.28	102.6	0.556
0.30	0 18.1	1 5.8	2 14.7	4 0.9	0.30	114.3	0.594
0.32	0 19.4	1 7.8	2 18.9	4 7.4	0.32	124.4	0.644
0.34	0 20.6	1 9.8	2 23.0	4 13.9	0.34	132.9	0.700
0.36	0 21.8	1 11.8	3 3.2	4 20.3	0.36	140.2	0.758
0.38	0 23.0	1 13.8	3 7.4	5 2.8	0.38	146.4	0.815
0.40	1 0.2	1 15.8	3 11.6	5 9.2	0.40	151.8	0.868
0.42	1 1.4	1 17.8	3 15.8	5 15.7	0.42	156.6	0.913
0.44	1 2.6	1 19.8	3 19.9	5 22.2	0.44	161.1	0.950
0.46	1 3.8	1 21.8	4 0.1	6 4.6	0.46	165.2	0.977
0.48	1 5.0	1 23.7	4 4.3	6 11.1	0.48	169.1	0.994
0.50	1 6.2	2 1.7	4 8.5	6 17.6	0.50	173.0	1.000
0.52	1 7.5	2 3.7	4 12.6	7 0.0	0.52	176.8	0.994
0.54	1 8.7	2 5.7	4 16.8	7 6.5	0.54	180.8	0.977
0.56	1 9.9	2 7.7	4 21.0	7 12.9	0.56	184.9	0.950
0.58	1 11.1	2 9.7	5 1.2	7 19.4	0.58	189.3	0.913
0.60	1 12.3	2 11.7	5 5.4	8 1.9	0.60	194.2	0.868
0.62	1 13.5	2 13.7	5 9.5	8 8.3	0.62	199.6	0.815
0.64	1 14.7	2 15.7	5 13.7	8 14.8	0.64	205.8	0.758
0.66	1 15.9	2 17.6	5 17.9	8 21.3	0.66	213.0	0.700
0.68	1 17.1	2 19.6	5 22.1	9 3.7	0.68	221.6	0.644
0.70	1 18.3	2 21.6	6 2.3	9 10.2	0.70	231.6	0.594
0.72	1 19.6	2 23.6	6 6.4	9 16.6	0.72	243.3	0.556
0.74	1 20.8	3 1.6	6 10.6	9 23.1	0.74	256.3	0.536
0.76	1 22.0	3 3.6	6 14.8	10 5.6	0.76	269.7	0.536
0.78	1 23.2	3 5.6	6 19.0	10 12.0	0.78	282.7	0.556
0.80	2 0.4	3 7.6	6 23.2	10 18.5	0.80	294.3	0.594
0.82	2 1.6	3 9.6	7 3.3	11 1.0	0.82	304.4	0.644
0.84	2 2.8	3 11.5	7 7.5	11 7.4	0.84	312.9	0.700
0.86	2 4.0	3 13.5	7 11.7	11 13.9	0.86	320.2	0.758
0.88	2 5.2	3 15.5	7 15.9	11 20.3	0.88	326.4	0.815
0.90	2 6.4	3 17.5	7 20.0	12 2.8	0.90	331.8	0.868
0.92	2 7.7	3 19.5	8 0.2	12 9.3	0.92	336.6	0.913
0.94	2 8.9	3 21.5	8 4.4	12 15.7	0.94	341.1	0.950
0.96	2 10.1	3 23.5	8 8.6	12 22.2	0.96	345.2	0.977
0.98	2 11.3	4 1.5	8 12.8	13 4.7	0.98	349.1	0.994
1.00	2 12.5	4 3.5	8 16.9	13 11.1	1.00	353.0	1.000

The fraction of a revolution is reckoned from the Northern Elongation.

Position angle of satellite $p = \rho + (P - P_0)$.Apparent distance of satellite $s = F \frac{a(\rho)}{\rho}$.

[Eph 15]

Date.	$P-P_0$	$\frac{a(p)}{p}$				Date.	$P-P_0$	$\frac{a(p)}{p}$			
		Ariel.	Umbriel.	Titania.	Oberon.			Ariel.	Umbriel.	Titania.	Oberon.
Apr. 9	•	"	"	"	"	Aug. 7	•	"	"	"	"
14	-0.5	13.0	18.2	29.7	39.7	12	+0.1	13.9	19.6	31.9	42.7
19	0.6	13.0	18.3	29.8	39.9	17	0.2	13.9	19.6	31.9	42.7
24	0.7	13.1	18.4	29.9	40.0	22	0.2	13.9	19.6	31.9	42.7
29	0.7	13.2	18.5	30.1	40.2	27	0.3	13.9	19.5	31.8	42.6
May 4	-0.8	13.2	18.6	30.3	40.5	Sept. 1	+0.4	13.9	19.5	31.8	42.5
9	0.8	13.3	18.7	30.4	40.7	6	0.4	13.8	19.5	31.7	42.4
14	0.8	13.3	18.8	30.6	40.9	11	0.5	13.8	19.4	31.6	42.3
19	0.8	13.4	18.8	30.7	41.0	16	0.6	13.8	19.4	31.5	42.2
24	0.8	13.4	18.9	30.8	41.2	21	0.6	13.7	19.3	31.5	42.0
29	-0.8	13.5	19.0	31.0	41.4	26	+0.7	13.7	19.2	31.4	41.9
June 3	0.8	13.6	19.1	31.1	41.5	Oct. 1	0.7	13.6	19.2	31.2	41.8
8	0.7	13.6	19.1	31.2	41.7	6	0.7	13.6	19.1	31.1	41.6
13	0.7	13.6	19.2	31.3	41.9	11	0.8	13.5	19.0	31.0	41.4
18	0.7	13.7	19.3	31.4	42.0	16	0.8	13.5	18.9	30.9	41.3
23	-0.6	13.7	19.3	31.5	42.1	21	+0.8	13.4	18.9	30.7	41.1
28	0.6	13.8	19.4	31.6	42.2	26	0.8	13.3	18.8	30.6	40.9
July 3	0.5	13.8	19.4	31.7	42.4	31	0.8	13.3	18.7	30.5	40.7
8	0.4	13.8	19.5	31.7	42.5	Nov. 5	0.8	13.2	18.6	30.3	40.6
13	0.4	13.9	19.5	31.8	42.5	10	0.7	13.2	18.5	30.2	40.4
18	-0.3	13.9	19.6	31.9	42.6	15	+0.7	13.1	18.5	30.1	40.2
23	0.2	13.9	19.6	31.9	42.7	20	0.6	13.1	18.4	30.0	40.1
28	0.2	13.9	19.6	31.9	42.7	25	0.6	13.0	18.3	29.8	39.9
Aug. 2	-0.1	13.9	19.6	32.0	42.7	30	+0.5	13.0	18.2	29.7	39.7

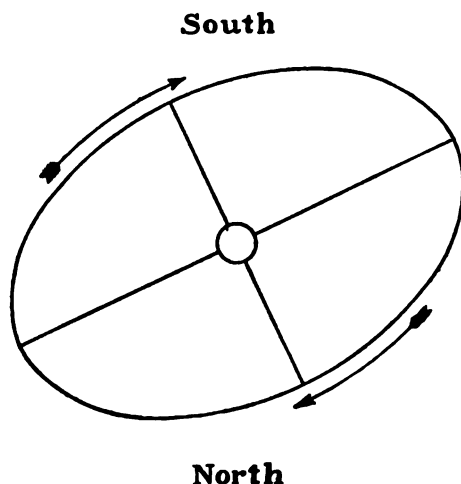
SATELLITE OF NEPTUNE, 1915.

Time from Eastern Elongation.		p^1	F	Time from Eastern Elongation.		p^1	F	Date.	$P-P_0$	$\frac{a(p)}{p}$	Date.	$P-P_0$	$\frac{a(p)}{p}$
d h	•			d h	•				•	"		•	"
0 0	115.2	1.000		3 0	292.7	0.999		Jan. 0	+0.6	16.8	Apr. 30	-1.6	16.1
0 3	110.2	0.995		3 3	287.8	0.988		5	0.5	16.8	May 5	1.5	16.1
0 6	105.2	0.979		3 6	282.6	0.968		10	0.3	16.9	10	1.4	16.1
0 9	99.9	0.954		3 9	277.2	0.939		15	+0.2	16.9	15	-1.3	16.1
0 12	94.3	0.921		3 12	271.4	0.902		20	0.0	16.9	Sept. 27	+3.6	16.1
0 15	88.2	0.881		3 15	265.0	0.859		25	-0.2	16.9	Oct. 2	+3.7	16.1
0 18	81.5	0.836		3 18	257.9	0.812		30	0.4	16.8	7	3.8	16.1
0 21	74.0	0.788		3 21	250.0	0.765		Feb. 4	0.5	16.8	12	3.9	16.2
1 0	65.5	0.742		4 0	241.0	0.721		9	0.7	16.8	17	4.0	16.2
1 3	56.0	0.701		4 3	231.0	0.684		14	0.8	16.8	22	4.0	16.3
1 6	45.5	0.660		4 6	220.0	0.658		19	-1.0	16.8	27	+4.1	16.3
1 9	34.1	0.649		4 9	208.3	0.645		24	1.1	16.7	Nov. 1	4.1	16.4
1 12	22.2	0.645		4 12	196.4	0.649		Mar. 1	1.2	16.7	6	4.1	16.4
1 15	10.6	0.657		4 15	185.0	0.660		6	1.3	16.7	11	4.1	16.5
1 18	359.5	0.683		4 18	174.4	0.701		11	1.4	16.6	16	4.1	16.5
1 21	349.5	0.721		4 21	164.9	0.742		16	-1.5	16.6	21	+4.0	16.5
2 0	340.5	0.765		5 0	156.5	0.788		21	1.6	16.6	26	4.0	16.6
2 3	332.6	0.812		5 3	149.0	0.835		26	1.6	16.5	Dec. 1	3.9	16.6
2 6	325.5	0.858		5 6	142.3	0.880		31	1.7	16.5	6	3.8	16.7
2 9	319.1	0.901		5 9	136.2	0.921		Apr. 5	1.7	16.4	11	3.7	16.7
2 12	313.3	0.939		5 12	130.5	0.954		10	-1.7	16.4	16	+3.6	16.7
2 15	307.8	0.968		5 15	125.3	0.979		15	1.7	16.3	21	3.5	16.8
2 18	302.7	0.988		5 18	120.2	0.995		20	1.7	16.3	26	3.3	16.8
2 21	297.7	0.999		5 21	115.3	1.000		25	-1.6	16.2	31	+3.2	16.8

Position angle of satellite $p = p^1 + (P - P_0)$.Apparent distance of satellite $= F \frac{a(p)}{p}$.

[Eph 13]

APPARENT ORBIT OF THE SATELLITE OF NEPTUNE AT DATE OF OPPOSITION, JANUARY 19, 1915, AS SEEN IN AN INVERTING TELESCOPE.



Date.	Position Angle of Apsis.	Apparent Distance at Apsis.
Jan. 20	115.2	16.8
Apr. 10	113.5	16.3
Oct. 7	110.0	16.1
Dec. 26	118.5	16.7

WASHINGTON MEAN TIME OF GREATEST ELONGATION.

East.		West.		East.		West.		East.		West.	
d	h	d	h	d	h	d	h	d	h	d	h
Jan. 4	3.8	Jan. 7	2.3	Mar. 27	11.4	Mar. 30	9.9	Oct. 13	4.6	Oct. 16	3.1
10	0.9	12	23.5	Apr. 2	8.5	Apr. 5	7.0	19	1.6	22	0.1
15	22.0	18	20.6	8	5.5	11	4.0	24	22.6	27	21.1
21	19.2	24	17.7	14	2.6	17	1.1	30	19.6	Nov. 2	18.1
27	16.3	30	14.8	19	23.6	22	22.1	Nov. 5	16.6	8	15.1
Feb. 2	13.4	Feb. 5	12.0	May 25	20.6	May 28	19.2	11	13.7	14	12.2
8	10.5	11	9.1	1	17.7	4	16.2	17	10.7	20	9.2
14	7.6	17	6.2	7	14.7	10	13.2	23	7.8	26	6.3
20	4.8	23	3.3	13	11.7	16	10.2	29	4.8	Dec. 2	3.4
26	1.9	Mar. 1	0.4	19	8.7	22	7.2	Dec. 5	1.9	8	0.4
Mar. 3	23.0	6	21.6	Sept.		Sept.		10	23.0	13	21.5
9	20.1	12	18.7	Sept. 25	13.6	Sept. 28	12.1	16	20.1	19	18.6
15	17.2	18	15.8	Oct. 1	10.6	Oct. 4	9.1	22	17.2	25	15.7
21	14.3	24	12.8	7	7.6	10	6.1	28	14.3	31	12.8

The above times are the instants of each passage of the satellite through the apsis of its apparent orbit. The position of the satellite at any other time may be found by measuring around the orbit from the apsis last passed through, bearing in mind that the radius vector of the satellite describes equal areas in equal times.

The sidereal period of the satellite of Neptune is 5^d 21^h.044.

NOTE.—In the preceding diagrams the central circle represents the planet and is on the same scale as the orbits.

WASHINGTON MEAN TIME.

PLANETARY CONFIGURATIONS.

d h m			° ' "			d h m			° ' "			
Jan.	1	2	-	♂ ♀ ♂	..... ♂	0 48	Mar.	20	23	43	☉ enters ♈, Spring com.
	1	19	-	♀	Greatest brilliancy.			22	17	30	♂ ♀ ☾ ♀ - 5 22	
	2	1	-	⊕	in Perihelion.			23	8	-	♂ ♀ ☾ ♂ - 0 12	
	2	7	5	♂ ♀ ☾	..... ♀ - 2 53			23	20	-	♂ in Aphelion.
	4	23	-	♂ ♀ ☉	Superior.			25	6	4	♂ ♀ ☾ ♀ - 2 55	
	6	14	-	♀	in Perihelion.			25	14	-	♀ in ☿	
	11	18	13	♂ ♀ ☾	..... ♀ + 9 42			29	8	-	♂ ♀ ☾ ♀ - 1 18
	14	10	44	♂ ♀ ☾	..... ♂ + 2 23	Apr.	3	9	-	♂ ♀ ♂	..... ♀ - 1 25
	15	6	-	♂	Greatest Hel. Lat. S.			4	23	-	♂ in Perihelion.	
	15	9	49	♂ ♀ ☾	..... ♀ + 0 7			8	6	52	♂ ☾ ☾ ☾ + 0 18
	16	1	18	♂ ☾ ☾	..... ☾ + 0 52			8	7	-	☿ Stationary.
	17	5	29	♂ ♀ ☾	..... ♀ - 0 54			10	9	58	♂ ♀ ☾ ♀ - 2 36
	19	12	-	♂ ♀ ☉				10	19	1	♂ ♀ ☾ ♀ - 3 6	
	20	17	-	♂ ♀ ☾	..... ♀ - 1 20			11	16	56	♂ ♀ ☾ ♂ - 4 12
	27	0	51	♂ ♀ ☾	..... ♀ - 5 37			12	8	40	♂ ♀ ☾ ♀ - 6 14
	28	12	-	♀	Greatest Hel. Lat. N.			13	5	-	♂	Greatest Hel. Lat. S.
	29	13	26	♂ ♀ ☾	..... ♀ - 2 56			14	23	-	♂ ♀ ☾ ♀ - 0 9
	31	21	-	♂ ☾ ☉				18	3	-	☿ ☾ ☾	
Feb.	1	14	-	♂ ♀ ☾	..... ♀ + 0 33			19	4	15	♂ ♀ ☾ ♀ - 5 0
	3	6	-	♂	in ☿			21	14	17	♂ ♀ ☾ ♀ - 2 41	
	5	13	-	♂	Great. elong. E. 18 14			28	20	-	♀ in Aphelion.	
	6	1	-	♀	Great. elong. W. 46 54	May	1	1	-	♂ ♀ ☉	Superior.	
	7	21	-	♂	in Perihelion.			2	5	-	♂ in ☿	
	9	18	34	♂ ♀ ☾	..... ♀ + 7 30			5	14	0	♂ ☾ ☾ ☾ - 0 1
	11	11	-	♂	Stationary.			6	12	-	☿ ☾ ☉	
	12	10	57	♂ ♀ ☾	..... ♂ + 0 24			6	20	-	♂ in Perihelion.
	12	13	21	♂ ☾ ☾	..... ☾ + 0 43			8	12	1	♂ ♀ ☾ ♀ - 3 54
	13	-	-	☉	Ann. ecl. invis. at W.			10	16	49	♂ ♀ ☾ ♀ - 6 28	
	14	3	19	♂ ♀ ☾	..... ♀ - 1 37			10	19	46	♂ ♀ ☾ ♂ - 5 38
	14	7	-	♂ ♀ ☾	..... ♂ - 0 27			13	20	-	♂ ♀ ♂ ♀ - 0 56
	14	10	7	♂ ♀ ☾	..... ♀ + 2 4			14	21	18	♂ ♀ ☾ ♀ - 2 51
	17	23	-	♂ ♀ ☾	..... ♀ + 4 44			16	15	52	♂ ♀ ☾ ♀ - 4 36
	18	4	-	♂	Greatest Hel. Lat. N.			17	3	-	♂	Greatest Hel. Lat. N.
	20	19	-	♂	in Perihelion.			18	21	43	♂ ♀ ☾ ♀ - 2 23	
	21	1	-	♂ ♀ ☉	Inferior.			21	0	-	☾	Stationary.
	23	8	6	♂ ♀ ☾ ♀ - 5 35			21	10	-	♀	Greatest Hel. Lat. S.
	23	22	-	♂ ♀ ☉				30	21	-	♂ ♀ ♀ ♀ + 2 29
	25	12	-	♂	Stationary.			31	4	-	♂	Great. elong. E. 23 16
	25	21	25	♂ ♀ ☾	..... ♀ - 3 0	June	1	21	47	♂ ☾ ☾ ☾ - 0 20	
	28	14	-	♂ ♀ ♂	..... ♀ + 4 14			5	3	0	♂ ♀ ☾ ♀ - 4 38
Mar.	5	7	-	♂	Stationary.			8	20	47	♂ ♀ ☾ ♂ - 6 1	
	11	8	24	♂ ♀ ☾ ♀ + 3 0			9	14	-	♂	in ☿
	11	9	-	♂	Greatest Hel. Lat. S.			9	22	9	♂ ♀ ☾ ♀ - 6 38	
	11	23	7	♂ ☾ ☾	..... ☾ + 0 33			13	4	14	♂ ♀ ☾ ♀ - 4 16
	12	20	36	♂ ♀ ☾ ♀ + 0 16			13	11	-	♂	Stationary.
	13	13	24	♂ ♀ ☾	..... ♂ - 1 59			13	14	34	♂ ♀ ☾ ♀ - 4 18
	13	15	-	♂	in ☿			15	4	54	♂ ♀ ☾ ♀ - 2 8	
	14	0	5	♂ ♀ ☾ ♀ - 2 20			18	18	-	☿ ☾ ☉	
	16	16	-	☿ ☾ ☉				19	20	-	♂	in Aphelion.
	18	13	-	♂ ♀ ☾ ♀ + 1 10			21	19	21	☉	enters ♍, Summer com.
	19	22	-	♂	Great. elong. W. 27 44			24	14	-	♂ ♀ ♀ ♀ - 3 14

WASHINGTON MEAN TIME.

PLANETARY CONFIGURATIONS.

d h m			d h m		
me 26 12 -	♂ ☿ ☉ Inferior.		Sept. 23 10 16	☉ enters ♊, Autumn com.	
28 0 -	♂ ♀ ☉		27 12 -	♂ Great. elong. E.	26 2
29 6 22	♂ ☿ ☉ ☿ - 0 28		Oct. 1 9 15	♂ ♀ ☉ ♀ - 3 13	
ily 2 15 34	♂ ♀ ☉ ♀ - 5 12		2 8 32	♂ ☿ ☉ ☿ - 0 43	
5 4 -	☉ in Aphelion.		2 17 59	♂ ☿ ☉ ☿ - 1 36	
7 19 52	♂ ☿ ☉ ☿ - 5 30		6 4 -	♂ Greatest Hel. Lat. S.	
7 20 -	♂ Stationary.		8 21 22	♂ ☿ ☉ ☿ + 6 10	
10 3 5	♂ ☿ ☉ ☿ - 4 7		9 18 32	♂ ☿ ☉ ☿ + 1 41	
10 3 42	♂ ☿ ☉ ☿ - 7 57		9 20 -	☉ Stationary.	
10 4 -	♂ Greatest Hel. Lat. S.		10 3 -	♂ Stationary.	
10 11 -	♂ ☿ ☿ ☿ - 3 50		11 2 -	♂ ☿ ☿ ☿ + 1 28	
10 17 25	♂ ♀ ☉ ♀ - 4 0		16 9 0	♂ ☿ ☉ ☿ - 0 26	
12 12 43	♂ ☿ ☉ ☿ - 1 59		17 0 -	♂ ☿ ☿ ☿ - 3 30	
16 17 -	♀ in ☿		19 9 16	♂ ♀ ☉ ♀ - 4 57	
16 20 -	♂ ☿ ♀ ♀ + 0 38		21 21 -	♂ ☿ ☉ Inferior.	
18 10 -	♂ Great. elong. W.	20 23	22 4 -	☿ Stationary.	
19 9 -	♂ Stationary.		25 4 -	♂ in ☿	
22 2 -	♂ ☿ ♀ ♀ - 1 0		26 10 -	☉ Stationary.	
23 11 -	♂ ☿ ☉ ☿ - 0 27		28 18 32	♂ ♀ ☉ ♀ - 2 53	
26 14 53	♂ ☿ ☉ ☿ - 0 27		29 7 -	♂ Stationary.	
29 5 -	♂ in ☿		29 19 -	♂ in Perihelion.	
30 0 52	♂ ♀ ☉ ♀ - 5 29		30 3 1	♂ ☿ ☉ ☿ - 1 18	
ug. 2 19 -	♂ in Perihelion.		30 9 -	♂ Stationary.	
3 19 -	♂ ☿ ☿ ☿ + 0 18		30 23 29	♂ ☿ ☉ ☿ + 1 34	
3 19 -	♂ ☿ ☿ ☿ + 1 21		Nov. 4 15 -	☉ Stationary.	
3 20 -	♂ ☿ ☿ ☿ + 1 3		5 6 -	♀ in ☿	
5 17 -	♂ in ☿		5 7 -	♂ Stationary.	
5 17 30	♂ ☿ ☉ ☿ - 4 22		5 11 6	♂ ☿ ☉ ☿ + 7 31	
6 14 -	♂ ☿ ☉ ☿ - 3 47		6 17 -	♂ Great. elong. W.	18 57
7 7 15	♂ ☿ ☉ ♀ - 3 47		7 17 28	♂ ☿ ☉ ♀ + 4 46	
8 21 41	♂ ☿ ☉ ☿ - 1 54		9 1 -	♂ Great. Hel. Lat. N.	
9 10 58	♂ ☿ ☉ ☿ - 0 2		9 10 -	☉ Stationary.	
9 22 6	♂ ☿ ☉ ☿ + 1 18		12 15 12	♂ ☿ ☉ ☿ - 0 43	
10 - -	☉ Ann. Ecl. invis. at W.		14 15 -	♂ Stationary.	
13 2 -	♂ Greatest Hel. Lat. N.		15 12 46	♂ ♀ ☉ ♀ - 4 59	
13 17 -	♂ ☿ ☉ Superior.		25 0 0	♂ ♀ ☉ ♀ - 2 41	
19 6 -	♀ in Perihelion.		26 9 54	♂ ☿ ☉ ☿ - 1 3	
22 22 18	♂ ☿ ☉ ☿ - 0 20		28 7 9	♂ ☿ ☉ ☿ + 3 52	
26 6 14	♂ ♀ ☉ ♀ - 5 27		Dec. 2 12 -	♂ in ☿	
pt. 3 13 55	♂ ☿ ☉ ☿ - 2 45		5 17 8	♂ ☿ ☉ ☿ + 4 9	
3 20 58	♂ ♀ ☉ ♀ - 3 31		7 13 28	♂ ☿ ☉ ♀ + 1 31	
5 7 46	♂ ☿ ☉ ☿ - 1 48		9 12 -	♀ in Aphelion.	
5 13 -	♂ in ☿		10 0 34	♂ ☿ ☉ ☿ - 1 2	
8 19 15	♂ ☿ ☉ ☿ + 4 19		12 8 -	☉ in Aphelion.	
10 5 -	♀ Greatest Hel. Lat. N.		12 18 -	♂ Stationary.	
10 6 -	♂ ☿ ♀ ♀ + 1 8		12 21 35	♂ ♀ ☉ ♀ - 5 14	
10 12 43	♂ ☿ ☉ ☿ + 3 50		15 7 -	♂ ☿ ☉ Superior.	
12 1 -	♂ ☿ ☉ Superior.		22 2 34	♂ ♀ ☉ ♀ - 2 41	
15 19 -	♂ in Aphelion.		22 5 8	☉ enters ♋, Winter com.	
16 19 -	♂ ☿ ☉		23 14 58	♂ ☿ ☉ ☿ - 0 56	
19 4 3	♂ ☿ ☉ ☿ - 0 18		26 2 1	♂ ☿ ☉ ☿ + 5 25	
22 8 15	♂ ♀ ☉ ♀ - 5 11				

No.	PLACE.	Geographic Latitude.	Reduction to Geocentric Latitude.	Altitude (Meters).	Log ρ (Including altitude).	Longitude from Washington.
		° ' "	' "			h m s
1	Abbadia, France . .	+43 22 52.2	-11 34.4	69	9.999 317	- 5 1 15.7
2	Adelaide	-34 55 38	+10 52.4	43	9.999 526	+ 9 37 23.92
3	Albany, N. Y . . .	+42 39 12.7	-11 33.1	67	9.999 336	- 0 13 9.0
4	Algiers	+36 47 50	-11 6.7	342	9.999 501	- 5 20 24.33
5	Allegheny, Pa . .	+40 28 58.0	-11 26.7	384	9.999 412	+ 0 11 49.61
6	Amherst, Mass. . .	+42 21 56.5	-11 32.5	110	9.999 346	- 0 18 9.85
7	Ann Arbor, Mich. .	+42 16 48.0	-11 32.3	285	9.999 360	+ 0 26 39.41
8	Appleton, Wis. . .	+44 15 39	-11 35.4	238	9.999 306	+ 0 45 20.11
9	Arcetri, Italy . . .	+43 45 14.6	-11 34.9	184	9.999 316	- 5 53 17.12
10	Arequipa, Peru . .	-16 22 28.0	+ 6 15.2	2452	0.000 052	- 0 22 4.05
11	Armagh, Ireland . .	+54 21 12.7	-10 59.6	61	9.999 040	- 4 41 40.4
12	Athens	+37 58 19.7	-11 14.3	107	9.999 456	- 6 43 8.70
13	Baltimore, Md. . .	+39 17 48	-11 21.5	75	9.999 421	- 0 1 49.8
14	Bamberg, Bavaria .	+49 53 6.0	-11 26.0	300	9.999 167	- 5 51 49.43
15	Barcelona, Spain . .	+41 25 18	-11 30.0	420	9.999 391	- 5 16 43.8
16	Bayswater	-31 55 13	+10 23.5	30	9.999 596	+11 8 6
17	Beloit, Wis. . . .	+42 30 8.4	-11 32.8	. . .	9.999 335	+ 0 47 51.5
18	Bergen, Norway . .	+60 23 54	- 9 58.6	. . .	9.998 895	- 5 29 28.53
19	Berkeley, Cal. . . .	+37 52 23.6	-11 13.7	97	9.999 458	+ 3 0 46.94
20	Berlin, Prussia . .	+52 30 16.7	-11 12.5	47	9.999 085	- 6 1 50.63
21	Berlin, Prussia . .	+52 31 30.7	-11 12.4	. . .	9.999 081	- 6 1 43.23
22	Berlin, Prussia . .	+52 29 7	-11 12.6	38	9.999 084	- 6 2 10.0
23	Berne, Switzerland	+46 57 8.7	-11 34.2	573	9.999 260	- 5 38 1.51
24	Besançon France . .	+47 14 59.0	-11 33.7	310	9.999 235	- 5 32 12.95
25	Bethlehem, Pa. . .	+40 36 23.1	-11 27.2	. . .	9.999 383	- 0 6 43.93
26	Birr Castle, Ireland	+53 5 47.0	-11 8.7	56	9.999 071	+ 4 36 34.9
27	Bloomington, Ind. .	+39 9 54	-11 20.8	266	9.999 437	+ 0 38 38
28	Bogota	+ 4 36 15.4	- 1 51.0	2634	0.000 170	- 0 11 21.58
29	Bombay, India . . .	+18 53 45	- 7 5.2	19	9.999 849	- 9 59 31.52
30	Bonn, Prussia . . .	+50 43 45.0	-11 22.3	62	9.999 130	- 5 36 39.00
31	Bordeaux France . .	+44 50 7.2	-11 35.6	73	9.999 281	- 5 6 10.24
32	Boston Mass. . . .	+42 20 58	-11 32.5	. . .	9.999 339	- 0 23 56.7
33	Bothkamp, Prussia .	+54 12 9.6	-11 0.8	32	9.999 042	- 5 48 47.0
34	Bremen, Germany . .	+53 4 36	-11 8.8	. . .	9.999 067	- 5 43 31.7
35	Breslau, Prussia . .	+51 6 55.8	-11 20.4	147	9.999 126	- 6 16 24.57
36	Brisbane	-27 28 0	+ 9 28.3	. . .	9.999 691	+ 8 39 37.8
37	Brussels, Belgium .	+50 47 55.5	-11 21.9	100	9.999 131	- 5 25 42.7
38	Budapest, Hungary .	+47 29 34.7	-11 33.2	. . .	9.999 208	- 6 24 31.1
39	Cambridge, Eng. . .	+52 12 51.6	-11 14.3	26	9.999 090	- 5 8 38.53
40	Cambridge, Mass. . .	+42 22 47.6	-11 32.6	24	9.999 340	- 0 23 44.73
41	Cape of Good Hope .	-33 56 3.6	+10 43.6	16	9.999 548	- 6 22 10.54
42	Carloforte	+39 8 9	-11 20.8	18	9.999 421	- 5 41 30.7
43	Catania, Sicily . . .	+37 30 13.3	-11 11.4	47	9.999 464	- 6 8 36
44	Charkow, Russia . .	+50 0 9.6	-11 25.5	138	9.999 153	- 7 33 11.55
45	Charlottesville, Va. .	+38 2 1.2	-11 14.6	250	9.999 464	+ 0 5 49.44

No.	LONGITUDE FROM GREENWICH.		Reduction from Gr. Sid. Time of Mean Noon to Local S. T. M. N.	DESCRIPTION.
	In Time.	In Arc.		
	h m s	° ' "	s	
1	+ 0 7 0.1	+ 1 45 1.5	+ 1.15	Obs. Paris Academy of Science, Hendaye.
2	- 9 14 20.30	- 138 35 4.5	- 91.06	South Australia.
3	+ 4 55 6.8	+ 73 46 42.0	+ 48.48	Dudley Obs. Old Obs. 36'' .8 N., 6°.79 E.
4	- 0 12 8.55	- 3 2 8.2	- 2.00	At Bouzaréah, near Algiers. Old Obs. 3'.8 S., 8° E.
5	+ 5 20 5.39	+ 80 1 20.8	+ 52.58	Univ. of Pittsburgh. Old Obs., 76'' .4 S., 2°.46 E.
6	+ 4 50 5.93	+ 72 31 29.0	+ 47.66	Amherst College Obs. Old Obs. 20'' .6 N., 1°.26 E.
7	+ 5 34 55.19	+ 83 43 47.8	+ 55.02	Detroit Obs. of the University of Michigan.
8	+ 5 53 35.89	+ 88 23 58.4	+ 58.09	Underwood Obs. of the Lawrence University.
9	- 0 45 1.34	- 11 15 20.1	- 7.40	Near Florence.
10	+ 4 46 11.73	+ 71 32 56.0	+ 47.02	Branch of the Harvard College Observatory.
11	+ 0 26 35.4	+ 6 38 51.0	+ 4.37	University Observatory.
12	- 1 34 52.92	- 23 43 13.8	- 15.59	National Observatory of Greece.
13	+ 5 6 26.0	+ 76 36 30	+ 50.34	Johns Hopkins University Observatory.
14	- 0 43 33.65	- 10 53 24.8	- 7.16	Remeis Observatory.
15	- 0 8 28.0	- 2 7 0	- 1.39	Fabra Obs. of the Royal Acad. of Sci. and Arts.
16	- 7 43 38	- 115 54 30	- 76.16	International Latitude Obs. West Australia.
17	+ 5 56 7.3	+ 89 1 49.5	+ 58.50	Smith Observatory of Beloit College.
18	- 0 21 12.75	- 5 18 11.2	- 3.48	Observatory of Naval School.
19	+ 8 9 2.72	+ 122 15 40.8	+ 80.34	Student's Obs. of the University of California.
20	- 0 53 34.85	- 13 23 42.8	- 8.80	Royal Obs. Old Obs. 56'' .4 N., 0°.39 W.
21	- 0 53 27.45	- 13 21 51.8	- 8.78	Urania Observatory.
22	- 0 53 54.2	- 13 28 33	- 8.86	Treptow Observatory.
23	- 0 29 45.73	- 7 26 26.0	- 4.89	Observatory of the Cantonal University.
24	- 0 23 57.17	- 5 59 17.6	- 3.94	National Observatory.
25	+ 5 1 31.85	+ 75 22 57.8	+ 49.53	Sayre Obs. of Lehigh Univ. at South Bethlehem.
26	+ 0 31 40.9	+ 7 55 13.5	+ 5.20	Private observatory of the Earl of Rosse.
27	+ 5 46 54	+ 86 43 30	+ 56.99	Kirkwood Obs. of the University of Indiana.
28	+ 4 56 54.20	+ 74 13 33.0	+ 48.77	National Obs. of the Republic of Colombia.
29	- 4 51 15.74	- 72 48 56.1	- 47.85	Government Obs. Colaba.
30	- 0 28 23.22	- 7 5 48.3	- 4.66	Royal University Observatory.
31	+ 0 2 5.54	+ 0 31 23.1	+ 0.34	Observatory, Univ. of Bordeaux at Floirac.
32	+ 4 44 19.1	+ 71 4 46.5	+ 46.71	Obs. of Boston Univ. Old Obs. 34'' N., 4°.1 E.
33	- 0 40 31.2	- 10 7 48.0	- 6.66	Observatory of Herr. von Bülow.
34	- 0 35 15.9	- 8 48 58.5	- 5.79	Formerly Olber's Observatory.
35	- 1 8 8.79	- 17 2 11.8	- 11.20	Royal University Observatory.
36	- 10 12 6.4	- 153 1 36	- 100.55	Queensland, Australia.
37	- 0 17 26.9	- 4 21 43.5	- 2.87	Royal Obs. of Belgium. Old Obs. 3'18'' N., 1°.8 E.
38	- 1 16 15.3	- 19 3 49.5	- 12.53	University Observatory.
39	- 0 0 22.75	- 0 5 41.2	- 0.06	University of Cambridge Observatory.
40	+ 4 44 31.05	+ 71 7 45.8	+ 46.74	Harvard College Observatory.
41	- 1 13 54.76	- 18 28 41.4	- 12.14	Royal Observatory.
42	- 0 33 14.9	- 8 18 43.5	- 5.46	Internat. Lat. Obs., Sardinia.
43	- 1 0 20	- 15 5 0	- 9.91	Royal Astrophysical Obs. of the University.
44	- 2 24 55.77	- 36 13 56.6	- 23.81	University Observatory.
45	+ 5 14 5.22	+ 78 31 18.3	+ 51.60	Leander McCormick Obs. of Univ. of Virginia.

No.	PLACE.	Geographic Latitude.	Reduction to Geocentric Latitude.	Altitude (Meters).	Log ρ (Including altitude).	Longitude from Washington.
		° ' "	' "			h m s
46	Chicago, Ill. . . .	+41 50 1.0	-11 31.2	. . .	9.999 352	+ 0 42 11.06
47	Christiania, Norway	+59 54 44.0	-10 4.6	25	9.998 908	- 5 51 9.30
48	Cincinnati, Ohio .	+39 8 19.5	-11 20.7	249	9.999 437	+ 0 29 25.62
49	Cleveland, Ohio .	+41 30 14.5	-11 30.2	212	9.999 375	+ 0 18 10.04
50	Clinton, N. Y. . .	+43 3 17.0	-11 33.9	276	9.999 340	- 0 6 38.33
51	Coimbra, Portugal	+40 12 24.5	-11 25.6	99	9.999 400	- 4 34 32.7
52	Columbia, Mo. . .	+38 56 51.7	-11 19.7	225	9.999 440	+ 1 1 2.55
53	Columbus, Ohio .	+39 59 50.4	-11 24.7	. . .	9.999 398	+ 0 23 46.8
54	Copenhagen . . .	+55 41 12.6	-10 48.6	14	9.999 005	- 5 58 34.48
55	Cordoba	-31 25 15.2	+10 18.0	434	9.999 634	- 0 51 27.56
56	Cracow, Austria .	+50 3 52.0	-11 25.2	220	9.999 157	- 6 28 6.06
57	Dantzig	+54 21 18.0	-10 59.6	3	9.999 036	- 6 22 55.4
58	Dehra Dun, India .	+30 18 51.8	-10 5.3	687	9.999 676	-10 20 29.25
59	Denver, Colo. . .	+39 40 36.4	-11 23.3	1650	9.999 519	+ 1 51 31.85
60	Des Moines, Iowa .	+41 36 0	-11 30.5	296	9.999 378	+ 1 6 14.78
61	Dorpat, Russia .	+58 22 47.1	-10 22.1	65	9.998 945	- 6 55 9.07
62	Dresden, Saxony .	+51 2 16.8	-11 20.8	. . .	9.999 118	- 6 3 10.63
63	Dublin, Ireland .	+53 23 13.1	-11 6.7	86	9.999 066	- 4 42 54.7
64	Dun Echt, Scotland	+57 9 36	-10 34.8	141	9.998 979	- 4 58 35.8
65	Durham, England	+54 46 6.2	-10 56.4	107	9.999 033	- 5 1 56.03
66	Düsseldorf, Prussia	+51 12 25.0	-11 19.9	26	9.999 115	- 5 35 20.8
67	Edinburgh, Scotland	+55 55 28.0	-10 46.5	134	9.999 007	- 4 55 31.6
68	Edinburgh, Scotland	+55 57 23.2	-10 46.2	106	9.998 995	- 4 55 32.7
69	Elmira, N. Y. . .	+42 6 25	-11 31.9	. . .	9.999 345	- 0 1 1.88
70	Evanston, Ill. . .	+42 3 33.4	-11 31.8	175	9.999 358	+ 0 42 26.5
71	Flagstaff, Ariz. .	+35 12 30.4	-10 54.7	2210	9.999 667	+ 2 18 28.79
72	Gaithersburg, Md.	+39 8 13.2	-11 20.7	165	9.999 431	+ 0 0 31.95
73	Geneva, N. Y. . .	+42 52 46.2	-11 33.6	152	9.999 336	- 0 0 14.78
74	Geneva, Switzerland	+46 11 58.8	-11 35.2	406	9.999 268	- 5 32 52.49
75	Genoa, Italy . . .	+44 25 9.3	-11 35.5	105	9.999 293	- 5 43 57.11
76	Georgetown, D. C.	+38 54 26.7	-11 19.5	46	9.999 429	+ 0 0 2.48
77	Glasgow, Mo. . .	+39 13 45.6	-11 21.1	227	9.999 433	+ 1 3 2.30
78	Glasgow, Scotland	+55 52 42.8	-10 46.9	55	9.999 003	- 4 51 5.23
79	Gotha, Germany .	+50 56 37.9	-11 21.2	320	9.999 142	- 5 51 6.27
80	Göttingen, Prussia	+51 31 47.9	-11 18.2	160	9.999 116	- 5 48 2.07
81	Greencastle, Ind. .	+39 38 46.6	-11 23.1	262	9.999 425	+ 0 39 8.56
82	Greenwich, England	+51 28 38.1	-11 18.5	47	9.999 110	- 5 8 15.78
83	Hamburg, Germany	+53 28 46.0	-11 6.1	40	9.999 060	- 5 49 14.3
84	Hamburg, Germany	+53 33 7.0	-11 5.6	25	9.999 057	- 5 48 9.6
85	Hamburg, Germany	+53 32 51.8	-11 5.6	30	9.999 058	- 5 48 9.20
86	Hanover, N. H. .	+43 42 15.3	-11 34.8	183	9.999 317	- 0 19 7.87
87	Haverford, Pa. .	+40 0 40.1	-11 24.8	. . .	9.999 398	- 0 7 3.08
88	Heidelberg, Baden	+49 23 55.2	-11 27.8	570	9.999 198	- 5 43 8.91
89	Heidelberg, Baden	+49 23 54.9	-11 27.8	562	9.999 198	- 5 43 10.03
90	Helsingfors, Finland	+60 9 42.6	-10 1.5	38	9.998 903	- 6 48 4.93
91	Herény, Hungary .	+47 15 47.4	-11 33.7	229	9.999 229	- 6 14 40.5

LONGITUDE FROM GREENWICH.		Reduction from Gr. Sid. Time of Mean Noon to Local S. T. M. N.	DESCRIPTION.
In Time.	In Arc.		
h m s	° ' "	"	
5 50 26.84	+ 87 36 42.6	+57.57	Old Obs.; transferred to Evanston, Ill., in 1887.
5 42 53.52	- 10 43 22.8	- 7.05	Observatory of the University.
5 37 41.40	+ 84 25 21.0	+55.48	Univ. Obs. on Mt. Lookout. Old Obs. 1'53''S. 17°.6W.
5 26 25.82	+ 81 36 27.3	+53.62	Obs. of Case School of Applied Science.
5 1 37.45	+ 75 24 21.7	+49.55	Litchfield Obs. of Hamilton College.
5 33 43.1	+ 8 25 46.5	+ 5.54	Royal Astronomical Observatory of Portugal.
5 9 18.33	+ 92 19 35.0	+60.67	Laws Observatory of the University of Missouri.
5 32 2.6	+ 83 0 39.0	+54.55	Emerson McMillan Obs. of Ohio State Univ.
5 50 18.70	- 12 34 40.5	- 8.26	University Observatory, Denmark.
4 16 48.22	+ 64 12 3.3	+42.19	National Observatory of Argentine Republic.
1 19 50.28	- 19 57 34.2	-13.12	Royal University Observatory.
1 14 39.6	- 18 39 54.0	-12.26	Western Prussia.
5 12 13.47	- 78 3 22.0	-51.29	Obs. Great Trigonometric Survey of India.
5 59 47.63	+104 56 54.4	+68.96	Chamberlin Observatory of the Univ. of Denver.
5 14 30.56	+ 93 37 38.4	+61.52	Drake University Observatory.
1 46 53.29	- 26 43 19.3	-17.56	Observatory Imperial University (Jurjew).
5 54 54.85	- 13 43 42.7	- 9.02	Baron Engelhardt's Observatory.
5 25 21.1	+ 6 20 16.5	+ 4.16	Observatory of Trinity College at Dunsink.
5 9 40.0	+ 2 25 0.0	+ 1.59	Formerly Lord Crawford's Observatory.
5 6 19.75	+ 1 34 56.3	+ 1.04	Observatory of the University.
5 27 5.0	- 6 46 15.0	- 4.45	Municipal Observatory, Bilk.
5 12 44.2	+ 3 11 3.0	+ 2.09	Royal Obs. of Scotland, Blackford Hill.
5 12 43.1	+ 3 10 46.5	+ 2.09	City Observatory, Calton Hill.
5 7 13.90	+ 76 48 28.5	+50.47	Elmira College Observatory.
5 50 42.3	+ 87 40 34.5	+57.61	Dearborn Observatory of North Western Univ.
7 26 44.57	+111 41 8.6	+73.39	Lowell Observatory.
5 8 47.73	+ 77 11 56.0	+50.73	International Latitude Observatory.
5 8 1.00	+ 77 0 15.0	+50.60	Smith Observatory.
5 24 36.71	- 6 9 10.7	- 4.04	Municipal Observatory.
5 35 41.33	- 8 55 20.0	- 5.86	Hydrographic Institute.
5 8 18.26	+ 77 4 33.9	+50.65	Georgetown College Observatory, Washington.
5 11 18.08	+ 92 49 31.2	+61.00	Morrison Observatory.
5 17 10.55	+ 4 17 38.3	+ 2.82	University Observatory.
5 42 50.49	- 10 42 37.3	- 7.04	Ducal Observatory, Saxe-Coburg-Gotha.
5 39 46.29	- 9 56 34.3	- 6.53	Royal University Observatory.
5 47 24.34	+ 86 51 5.1	+57.07	McKim Observatory of De Pauw University.
5 0 0.00	0 0 0.0	0.00	Royal Observatory.
5 40 58.5	- 10 14 37.5	- 6.73	New Observatory, Bergedorf.
5 39 53.8	- 9 58 27.0	- 6.55	Old Observatory.
5 39 53.42	- 9 58 21.3	- 6.55	Imperial Marine Observatory.
4 49 7.91	+ 72 16 58.7	+47.50	Shattuck Observatory of Dartmouth College.
5 1 12.70	+ 75 18 10.5	+49.48	Haverford College Observatory.
5 34 53.13	- 8 43 17.0	- 5.73	Astronomical Institute, Königstuhl.
5 34 54.25	- 8 43 33.7	- 5.73	Astrophysical Institute, Königstuhl.
5 39 49.15	- 24 57 17.3	-16.40	University Observatory.
5 6 24.7	- 16 36 10.5	-10.91	Astrophysical Obs., near Steinamanger.

No.	PLACE.	Geographic Latitude.	Reduction to Geocentric Latitude.	Altitude (Meters).	Log ρ (Including altitude).	Longitude from Washington.
		' ' "	' "			h m s
92	Hong Kong, China	+22 18 13.4	- 8 7.4	34	9.999 793	+11 15 2.36
93	Iowa City, Iowa . .	+41 40 0	-11 30.7	183	9.999 369	+ 0 57 50
94	Ithaca, N. Y. . .	+42 26 47.3	-11 32.6	256	9.999 354	- 0 2 19.79
95	Jamaica, West Indies	+18 24 51	- 6 55.9	. . .	9.999 855	+ 0 3 13.70
96	Jena, Saxe-Weimar	+50 55 34.9	-11 21.3	156	9.999 131	- 5 54 36.05
97	Jena, Saxe-Weimar	+50 56 11.0	-11 21.3	174	9.999 132	- 5 54 36.56
98	Johannesburg . .	-26 10 54.5	+ 9 9.8	1806	9.999 840	- 7 0 33.8
99	Kalocsa . . .	+46 31 41.7	-11 34.8	117	9.999 240	- 6 24 10.12
100	Kasan, Russia . .	+55 50 20.0	-10 47.3	98	9.999 007	- 8 23 32.3
101	Kasan, Russia . .	+55 47 24.3	-10 47.7	79	9.999 007	- 8 24 44.82
102	Kew, Eng. . . .	+51 28 6	-11 18.5	11	9.999 108	- 5 7 0.7
103	Kief, Russia . .	+50 27 10.5	-11 23.5	182	9.999 145	- 7 10 16.42
104	Kiel, Prussia . .	+54 20 27.6	-10 59.7	48	9.999 040	- 5 48 51.33
105	Kis-Kartal . . .	+47 41 54.8	-11 32.8	. . .	9.999 202	- 6 26 27.5
106	Königsberg, Prussia	+54 42 50.4	-10 56.8	22	9.999 029	- 6 30 14.82
107	Kremsmünster . .	+48 3 23.1	-11 32.0	384	9.999 220	- 6 4 47.37
108	La Plata	-34 54 30.3	+10 52.2	12	9.999 524	+ 1 16 38.8
109	Lawrence, Kansas	+38 57 26	-11 7.8	311	9.999 495	+ 1 12 42
110	Leiden, Netherlands	+52 9 20.0	-11 14.6	4	9.999 090	- 5 26 11.95
111	Leipzig, Saxony .	+51 20 5.9	-11 19.2	119	9.999 118	- 5 57 49.76
112	Liège, Belgium .	+50 37 7	-11 22.8	127	9.999 137	- 5 30 31.0
113	Lisbon, Portugal .	+38 42 30.5	-11 18.5	94	9.999 437	- 4 31 31.10
114	Liverpool, Eng. .	+53 24 4.8	-11 6.6	62	9.999 064	- 4 55 58.45
115	Lund, Sweden . .	+55 41 51.6	-10 48.5	38	9.999 006	- 6 1 0.79
116	Lussinpiccolo . .	+44 32 11.0	-11 35.5	42	9.999 286	- 6 6 8.19
117	Lyons, France . .	+45 41 41.0	-11 35.5	300	9.999 274	- 5 27 24.33
118	Madison, Wis. . .	+43 4 36.8	-11 33.9	292	9.999 340	+ 0 49 22.15
119	Madras, India . .	+13 4 8.0	- 5 5.5	7	9.999 926	-10 29 14.90
120	Madrid, Spain . .	+40 24 29.7	-11 26.4	655	9.999 433	- 4 53 30.66
121	Manila, P. I. . .	+14 35 25	- 5 38.2	3	9.999 908	+10 47 54
122	Mare Island, Cal. .	+38 5 55.8	-11 15.0	22	9.999 447	+ 3 0 49.8
123	Markree, Ireland .	+54 10 31.8	-11 1.0	45	9.999 044	- 4 34 27.4
124	Marseilles, France .	+43 18 17.5	-11 34.3	75	9.999 320	- 5 29 50.37
125	Mauritius	-20 5 39	+ 7 27.7	55	9.999 832	- 8 58 28.4
126	Melbourne, Victoria	-37 49 53.4	+11 13.4	28	9.999 454	+ 9 11 50.2
127	Meudon, France .	+48 48 18	-11 29.8	162	9.999 185	- 5 17 11.4
128	Middletown, Conn.	+41 33 16.0	-11 30.4	. . .	9.999 359	- 0 17 38.60
129	Milan, Italy . . .	+45 27 59.3	-11 35.6	120	9.999 268	- 5 45 1.70
130	Minneapolis, Minn.	+44 58 40.0	-11 35.7	260	9.999 290	+ 1 4 41.06
131	Mizusawa, Japan .	+39 8 3.6	-11 20.7	62	9.999 424	+ 9 27 13.47
132	Modena, Italy . .	+44 38 52.8	-11 35.6	. . .	9.999 280	- 5 51 58.7
133	Montreal, Canada .	+45 30 17.0	-11 35.6	67	9.999 263	- 0 13 57.15
134	Moscow, Russia .	+55 45 19.8	-10 48.0	150	9.999 012	- 7 38 32.87
135	Mount Hamilton .	+37 20 25.6	-11 10.4	1283	9.999 552	+ 2 58 19.11
136	Mount Wilson . .	+34 12 59.5	-10 46.2	1800	9.999 663	+ 2 43 58.55

LONGITUDE FROM GREENWICH.			Reduction from Gr. Sid. Time of Mean Noon to Local S. T. M. N.	DESCRIPTION.
In Time.	In Arc.			
h m s	° ' "	s		
-7 36 41.86	-114 10 27.9	-75.01		British Colonial Observatory.
+6 6 6	+ 91 31 30	+60.14		Obs. of the State Univ. of Iowa.
+5 5 55.99	+ 76 28 59.9	+50.26		Observatory of Cornell University.
+5 11 29.48	+ 77 52 22.2	+51.17		Mr. Hall's Observatory, Montego Bay.
-0 46 20.27	- 11 35 4.0	- 7.61		University Observatory.
-0 46 20.78	- 11 35 11.7	- 7.61		The late Dr. Winkler's Observatory.
-1 52 18.0	- 28 4 30.0	-18.45		Union Observatory, Transvaal.
-1 15 54.34	- 18 58 35.1	-12.47		Haynald Obs., Hungary.
-3 15 16.5	- 48 49 7.5	-32.08		Englehardt Observatory.
-3 16 29.04	- 49 7 15.6	-32.28		Imperial Univ. Observatory.
+0 1 15.1	+ 0 18 46.5	+ 0.21		Meteorological Obs., Kew Gardens, London.
-2 2 0.64	- 30 30 9.6	-20.04		Imperial University Observatory.
-0 40 35.55	- 10 8 53.3	- 6.67		Old position of Transit Circle, $0^{\circ} 9' N.$, $0^{\circ} 12' E.$
-1 18 11.7	- 19 32 55.5	-12.85		Near Aszód, Hungary.
-1 21 59.04	- 20 29 45.6	-13.47		Royal University Observatory.
-0 56 31.59	- 14 7 53.9	- 9.29		Obs. of the Benedictines, Austria.
+3 51 37.0	+ 57 54 15.0	+38.05		Obs. National Univ., Argentine Republic.
+6 20 58	+ 95 14 30	+62.58		Obs. of the State Univ. of Kansas.
-0 17 56.17	- 4 29 2.6	- 2.95		University Observatory.
-0 49 33.98	- 12 23 29.7	- 8.14		University Observatory.
-0 22 15.2	- 5 33 48.0	- 3.66		University Observatory, Cointe.
+0 36 44.68	+ 9 11 10.2	+ 6.04		Royal Astronomical Obs., Tapada.
+0 12 17.33	+ 3 4 20.0	+ 2.02		Bidston, Birkenhead.
-0 52 45.01	- 13 11 15.1	- 8.67		Royal Observatory of the University.
-0 57 52.41	- 14 28 6.1	- 9.51		Manora Observatory, Austria.
-0 19 8.55	- 4 47 8.3	- 3.14		Obs. of the Univ., St. Genis, Laval.
+5 57 37.93	+ 89 24 29.0	+58.75		Washburn Obs. of Univ. of Wisconsin.
-5 20 59.12	- 80 14 46.8	-52.73		Founded by East India Company.
+0 14 45.12	+ 3 41 16.8	+ 2.42		Ast. and Meteorological Observatory.
-8 3 50	-120 57 30	-79.48		Meteorological Observatory.
+8 9 5.6	+122 16 24.0	+80.35		Chronometer and Time Station, Navy Yard.
+0 33 48.4	+ 8 27 6.0	+ 5.55		Obs. of Col. Cooper, near Collooney.
-0 21 34.59	- 5 23 38.9	- 3.54		National Obs., Univ. of Aix-Marseilles.
-3 50 12.6	- 57 33 9.0	-37.82		Royal Alfred Observatory, Port-Louis.
-9 39 54.0	-144 58 30.0	-95.26		State Obs.; transf. from Williamstown in 1861.
-0 8 55.6	- 2 13 54.0	- 1.47		Seine-et-Oise, near Paris.
+4 50 37.18	+ 72 39 17.7	+47.74		Wesleyan University Observatory.
-0 36 45.92	- 9 11 28.8	- 6.04		Royal Observatory, Brera.
+6 12 56.84	+ 93 14 12.6	+61.27		Obs. of the State University of Minnesota.
-9 24 30.75	-141 7 41.3	-92.74		International Latitude Observatory.
-0 43 42.9	- 10 55 43.5	- 7.18		Ducal Observatory.
+4 54 18.63	+ 73 34 39.4	+48.35		McGill University Observatory.
-2 30 17.09	- 37 34 16.3	-24.69		Obs. of the Imperial University, Presnía.
+8 6 34.89	+121 38 43.3	+79.93		Lick Obs. of the University of California.
+7 52 14.33	+118 3 34.9	+77.58		Solar Observatory, near Pasadena, Cal.

No.	PLACE.	Geographic Latitude.	Reduction to Geocentric Latitude.	Altitude (Meters).	Log ρ (Including altitude).	Longitude from Washington.
		' ' "	' "			h m s
137	Munich, Bavaria . .	+48 8 45.5	-11 31.7	528	9.999 227	- 5 54 41.85
138	Naples, Italy . .	+40 51 46.3	-11 28.1	154	9.999 387	- 6 5 17.51
139	Nashville, Tenn. . .	+36 8 54.4	-11 2.0	. . .	9.999 494	+ 0 38 56.4
140	Natal, S. Africa . .	-29 50 46.6	+ 9 59.6	79	9.999 645	- 7 12 16.96
141	Neuchâtel . . .	+46 59 50.6	-11 34.1	488	9.999 254	- 5 36 5.71
142	New Brunswick, N. J.	+40 30 1.3	-11 26.7	21	9.999 387	- 0 10 28.4
143	New Haven, Conn.	+41 19 22.3	-11 29.6	40	9.999 368	- 0 16 35.20
144	New York, N. Y. . .	+40 48 34.6	-11 27.9	. . .	9.999 378	- 0 12 26
145	Nice, France . . .	+43 43 16.9	-11 34.9	376	9.999 330	- 5 37 27.96
146	Nikolaieff, Russia .	+46 58 21.8	-11 34.2	55	9.999 225	- 7 16 9.58
147	Northampton, Mass.	+42 19 2	-11 32.4	81	9.999 345	- 0 17 42.7
148	Northfield, Minn. .	+44 27 41.6	-11 35.5	320	9.999 307	+ 1 4 20.03
149	Oakland, Cal. . . .	+37 48 5	-11 13.2	11	9.999 454	+ 3 0 50.77
150	Odessa, Russia . . .	+46 28 37.9	-11 34.9	. . .	9.999 234	- 7 11 18.0
151	Odessa, Russia . . .	+46 28 36.7	-11 34.9	55	9.999 237	- 7 11 17.88
152	O-Gyalla, Hungary	+47 52 27.3	-11 32.4	113	9.999 206	- 6 21 1.32
153	Omaha, Nebr. . . .	+41 16 5.6	-11 29.5	344	9.999 390	+ 1 15 31.18
154	Oncativo, Arg. Rep.	-31 55 10	+10 23.5	280	9.999 613	- 0 53 31.0
155	Orono, Maine . . .	+44 53 58	-11 35.6	41	9.999 277	- 0 33 35.5
156	Ottawa, Canada . .	+45 23 37.6	-11 35.6	85	9.999 267	- 0 5 23.78
157	Oxford, Miss. . . .	+34 22 12.6	-10 47.5	. . .	9.999 536	+ 0 49 51.3
158	Oxford, Eng. . . .	+51 45 35.4	-11 16.9	65	9.999 104	- 5 3 13.2
159	Oxford, Eng. . . .	+51 45 34.2	-11 16.9	64	9.999 104	- 5 3 15.4
160	Padua, Italy	+45 24 5	-11 35.6	30	9.999 263	- 5 55 44.97
161	Palermo, Sicily . .	+38 6 44.0	-11 15.1	72	9.999 450	- 6 1 41.68
162	Paris, France . . .	+48 50 11.2	-11 29.8	61	9.999 178	- 5 17 36.75
163	Perth	-31 57 8.9	+10 23.8	61	9.999 597	+11 8 22.48
164	Philadelphia, Pa. . .	+39 58 2.1	-11 24.6	74	9.999 404	- 0 7 9.2
165	Pola, Austria . . .	+44 51 48.7	-11 35.6	30	9.999 277	- 6 3 38.67
166	Potsdam, Prussia . .	+52 22 56.0	-11 13.3	97	9.999 091	- 6 0 31.7
167	Poughkeepsie, N. Y.	+41 41 18	-11 30.8	46	9.999 359	- 0 12 42.13
168	Prague, Bohemia . .	+50 5 15.8	-11 25.1	197	9.999 155	- 6 5 56.1
169	Princeton, N. J. . .	+40 20 55.8	-11 26.1	50	9.999 393	- 0 9 36.34
170	Providence, R. I. . .	+41 50 21	-11 31.2	64	9.999 356	- 0 22 39.83
171	Providence, R. I. . .	+41 49 46.4	-11 31.2	. . .	9.999 352	- 0 22 38.14
172	Pulkowa, Russia . .	+59 46 18.7	-10 6.2	74	9.998 914	- 7 9 34.42
173	Quebec, Canada . .	+46 47 59.2	-11 34.4	90	9.999 231	- 0 23 23.14
174	Quito	- 0 14 0	+ 0 5.6	2908	0.000 198	+ 0 5 50.88
175	Riga, Russia	+56 57 9.3	-10 36.9	. . .	9.998 974	- 6 44 43.95
176	Rio de Janeiro . . .	-22 54 23.6	+ 8 17.7	61	9.999 784	- 2 15 34.4
177	Rome, Italy	+41 53 53.6	-11 31.3	51	9.999 354	- 5 58 11.33
178	Rome, Italy	+41 53 33.5	-11 31.3	65	9.999 355	- 5 58 12.15
179	Rome, Italy	+41 54 4.8	-11 31.4	100	9.999 357	- 5 58 5.25
180	San Fernando	+36 27 42.0	-11 4.3	30	9.999 488	- 4 43 26.6
181	San Francisco, Cal.	+37 47 27.9	-11 13.2	. . .	9.999 454	+ 3 1 27.08

LONGITUDE FROM GREENWICH.		Reduction from Gr. Sid. Time of Mean Noon to Local S. T. M. N.	DESCRIPTION.
Time.	In Arc.		
m s	° ' "	s	
16 26.07	- 11 36 31.0	- 7.63	Royal Observatory.
17 1.73	- 14 15 26.0	- 9.37	Royal Obs., Capo di Monte.
17 12.2	+ 86 48 3.0	+57.04	Observatory of Vanderbilt University.
4 1.18	- 31 0 17.7	-20.37	Government Observatory, Durban.
17 49.93	- 6 57 29.0	- 4.57	Cantonal Observatory, Switzerland.
17 47.4	+ 74 26 51	+48.92	Schanck Obs., Rutgers College.
11 40.58	+ 72 55 8.7	+47.92	Yale University Obs. Old Obs. 45'' 8 S., 1° 58 W.
15 50	+ 73 57 30	+48.60	Columbia Univ. Obs. Old Obs. 3' 11'' 5 S., 3° 6 E.
19 12.18	- 7 18 2.7	- 4.80	Mt. Gros, near Nice.
7 53.80	- 31 58 27.0	-21.01	Naval Observatory.
10 33.1	+ 72 38 16.5	+47.73	Smith College Observatory.
12 35.81	+ 93 8 57.1	+61.21	Goodsell Observatory of Carleton College.
9 6.55	+122 16 38.3	+80.35	Chabot Observatory
3 2.18	- 30 45 32.7	-20.21	Branch of Pulkowa Observatory.
3 2.10	- 30 45 31.5	-20.21	University Observatory.
12 45.54	- 18 11 23.1	-11.95	Royal Astrophysical Observatory.
13 46.96	+ 95 56 44.4	+63.05	Creighton University Observatory.
4 44.8	+ 63 41 12.0	+41.85	International Latitude Observatory.
14 40.3	+ 68 40 4.5	+45.12	Observatory of the University of Maine.
2 52.00	+ 75 43 0.0	+49.75	Dominion Observatory.
18 7.1	+ 89 31 46.5	+58.83	Observatory of the University of Mississippi.
5 2.6	+ 1 15 39.0	+ 0.83	Radcliffe Observatory.
5 0.4	+ 1 15 6.0	+ 0.82	University Observatory
17 29.19	- 11 52 17.9	- 7.80	Royal University Observatory.
13 25.90	- 13 21 28.5	- 8.78	Royal Observatory.
9 20.97	- 2 20 14.6	- 1.53	National Observatory.
13 21.74	-115 50 26.1	-76.12	State Observatory, West Australia.
1 6.6	+ 75 16 39.0	+49.46	Flower Observatory University of Pennsylvania.
15 22.89	- 13 50 43.3	- 9.10	Obs. of the Imperial Hydrographic Office.
12 15.9	- 13 3 58.5	- 8.59	Royal Astrophysical Observatory.
15 33.65	+ 73 53 24.7	+48.55	Vassar College Observatory.
17 40.3	- 14 25 4.5	- 9.47	Royal Observatory of the University.
18 39.44	+ 74 39 51.6	+49.06	Halsted Observatory of Princeton University.
5 35.95	+ 71 23 59.3	+46.92	Ladd Observatory of Brown University.
5 37.64	+ 71 24 24.6	+46.92	Mr. Seagrave's Observatory.
1 18.64	- 30 19 39.6	-19.93	Obs. Central Nicolas, near St. Petersburg.
4 52.64	+ 71 13 9.6	+46.80	Bonner's Hill.
4 6.66	+ 78 31 39.9	+51.60	National Observatory of Ecuador.
16 28.17	- 24 7 2.6	-15.85	Polytechnic School Observatory.
12 41.4	+ 43 10 21.0	+28.37	National Observatory of Brazil.
9 55.55	- 12 28 53.3	- 8.20	Royal Observatory at Roman College.
9 56.37	- 12 29 5.6	- 8.20	Royal University Observatory at Capitol.
9 49.47	- 12 27 22.0	- 8.18	Vatican Observatory
4 49.2	+ 6 12 18.0	+ 4.08	Naval Observatory, near Cadiz, Spain.
9 42.86	+122 25 42.9	+80.45	Davidson Observatory.

No.	PLACE.	Geographic Latitude.	Reduction to Geocentric Latitude.	Altitude (Meters).	Log ρ (Including altitude).	Longitude from Washington.
		° ' "	' "			h m s
182	San Luis, Arg. Rep.	-33 17 45.7	+10 37.6	800	9.999 616	- 0 42 54
183	Santiago, Chile	-33 26 42.0	+10 39.0	519	9.999 594	- 0 25 29.56
184	South Hadley, Mass.	+42 15 18.2	-11 32.2	76	9.999 346	- 0 17 55.49
185	St. Louis, Mo. . .	+38 38 3.0	-11 18.1	. . .	9.999 432	+ 0 52 33.48
186	St. Petersburg . .	+59 56 32.0	-10 4.2	4	9.998 906	- 7 9 27.2
187	Stockholm Sweden	+59 20 33.0	-10 11.3	44	9.998 922	- 6 20 29.77
188	Stonyhurst, Eng. .	+53 50 40	-11 3.4	116	9.999 056	- 4 58 23.10
189	Strassburg, Alsace	+48 35 0.3	-11 30.5	144	9.999 190	- 5 39 20.47
190	Swarthmore, Pa. .	+39 54 23.3	-11 24.3	. . .	9.999 401	- 0 6 50.89
191	Sydney, N. S. W. .	-33 51 41.1	+10 42.9	44	9.999 552	+ 8 46 54.68
192	Syracuse, N. Y. .	+43 2 13.1	-11 33.9	160	9.999 332	- 0 3 42.42
193	Tacubaya . . .	+19 24 17.5	- 7 14.8	2280	9.999 995	+ 1 28 30.75
194	Tashkent . . .	+41 19 31.3	-11 29.6	457	9.999 396	- 9 45 26.58
195	Taunton, Mass. .	+41 54 0	-11 31.3	8	9.999 351	- 0 23 56
196	Teramo Italy . .	+42 39 27	-11 33.1	398	9.999 358	- 6 3 12
197	Tokyo, Japan . .	+35 39 17.5	-10 58.3	. . .	9.999 507	+ 9 32 46.20
198	Toronto, Canada .	+43 39 35.9	-11 34.8	108	9.999 313	+ 0 9 18.87
199	Toulouse, France .	+43 36 45	-11 34.7	194	9.999 320	- 5 14 5.66
200	Triest, Austria . .	+45 38 45.4	-11 35.5	67	9.999 260	- 6 3 18.73
201	Troy, N. Y. : . .	+42 43 52.9	-11 33.4	. . .	9.999 329	- 0 13 33.49
202	Tschardjui . . .	+39 8 10.7	-11 20.7	167	9.999 431	- 9 22 13.1
203	Tulse Hill . . .	+51 26 47.0	-11 18.6	48	9.999 111	- 5 7 48.1
204	Turin, Italy . . .	+45 4 8.0	-11 35.7	276	9.999 288	- 5 39 2.96
205	Tuscaloosa, Ala. .	+33 12 36.8	-10 36.7	. . .	9.999 564	+ 0 41 55.96
206	Ukiah, Cal. . . .	+39 8 12.1	-11 20.7	220	9.999 435	+ 3 4 34.5
207	Upsala, Sweden . .	+59 51 29.4	-10 5.2	21	9.998 909	- 6 18 45.93
208	Urbana, Ill. . . .	+40 6 20.2	-11 25.2	236	9.999 412	+ 0 44 38.2
209	Utrecht, Netherlands	+52 5 9.6	-11 15.0	13	9.999 093	- 5 28 46.8
210	Venice, Italy . . .	+45 26 10.5	-11 35.6	15	9.999 261	- 5 57 37.90
211	Vienna, Austria . .	+48 13 55.4	-11 31.5	240	9.999 205	- 6 13 37.17
212	Vienna, Austria . .	+48 12 53.8	-11 31.6	214	9.999 204	- 6 13 41.1
213	Vienna, Austria . .	+48 12 46.7	-11 31.6	280	9.999 208	- 6 13 26.89
214	Warsaw Russia . .	+52 13 4.7	-11 14.3	110	9.999 096	- 6 32 23.06
215	Washington, D. C.	+38 55 14.0	-11 19.6	82	9.999 431	- 0 0 0.00
216	Washington, D. C.	+38 53 38.8	-11 19.4	31	9.999 428	- 0 0 3.63
217	Washington, D. C.	+38 53 17.3	-11 19.4	9	9.999 427	- 0 0 9.6
218	Washington, D. C.	+38 56 14.8	-11 19.7	. . .	9.999 425	- 0 0 15.78
219	Wellesley, Mass. .	+42 17 34.8	-11 32.3	61	9.999 344	- 0 23 3
220	Wellington, N. Z. .	-41 17 3.8	+11 29.5	127	9.999 375	+ 7 12 39.95
221	West Point, N. Y.	+41 23 22.1	-11 29.9	170	9.999 375	- 0 12 25.23
222	Wilhelmshaven . .	+53 31 52.2	-11 5.7	8	9.999 057	- 5 40 50.89
223	Williams Bay, Wis.	+42 34 12.6	-11 33.0	335	9.999 356	+ 0 45 57.46
224	Williamstown, Mass.	+42 42 30	-11 33.2	213	9.999 344	- 0 15 26
225	Windsor N. S. W.	-33 36 30.8	+10 40.6	16	9.999 556	+ 8 48 23.7
226	Zô-Sè, China . . .	+31 5 47.7	-10 14.4	100	9.999 619	+10 46 59.5
227	Zürich	+47 22 38.3	-11 33.5	468	9.999 243	- 5 42 28.08

LONGITUDE FROM GREENWICH.		Reduction from Gr. Sid. Time of Mean Noon to Local S. T. M. N.	DESCRIPTION.
In Time.	In Arc.		
h m s	° ' "	s	
+ 4 25 22	+ 66 20 30	+ 43.60	Southern Observatory of Carnegie Institution.
+ 4 42 46.22	+ 70 41 33.3	+ 46.45	National Obs. of Chile. Old Obs. 16'' .6N., 9°.5 E.
+ 4 50 20.29	+ 72 35 4.3	+ 47.70	Observatory of Mt. Holyoke College.
+ 6 0 49.26	+ 90 12 18.9	+ 59.27	Washington University Observatory.
- 2 1 11.4	- 30 17 51.0	- 19.91	Imperial University Observatory, Russia.
- 1 12 13.99	- 18 3 29.9	- 11.87	Observatory of Academy of Science.
+ 0 9 52.68	+ 2 28 10.2	+ 1.62	Stonyhurst College Observatory, near Blackburn.
- 0 31 4.69	- 7 46 10.3	- 5.11	Imperial University Observatory.
+ 5 1 24.89	+ 75 21 13.4	+ 49.52	Sproul Observatory of Swarthmore College.
- 10 4 49.54	- 151 12 23.1	- 99.36	Government Observatory.
+ 5 4 33.36	+ 76 8 20.4	+ 50.03	Observatory of Syracuse University.
+ 6 36 46.53	+ 99 11 38.0	+ 65.18	National Observatory of Mexico.
- 4 37 10.80	- 69 17 42.0	- 45.53	Turkestan, Russia.
+ 4 44 20	+ 71 5 0	+ 46.71	Mr. Metcalf's Observatory.
- 0 54 56	- 13 44 0	- 9.02	At Collurania, near Teramo.
- 9 18 58.02	- 139 44 30.3	- 91.82	University Observatory.
+ 5 17 34.65	+ 79 23 39.7	+ 52.17	University Observatory.
- 0 5 49.88	- 1 27 28.2	- 0.96	University Observatory.
- 0 55 2.95	- 13 45 44.3	- 9.04	Imperial Maritime Observatory.
+ 4 54 42.29	+ 73 40 34.3	+ 48.41	Observatory Rensselaer Polytechnic Institute.
- 4 13 57.3	- 63 29 19.5	- 41.72	International Latitude Obs., Turkestan.
+ 0 0 27.7	+ 0 6 55.5	+ 0.08	Observatory of Sir W. Huggins, London.
- 0 30 47.18	- 7 41 47.7	- 5.06	Royal Observatory, Palazzo Madama.
+ 5 50 11.74	+ 87 32 56.1	+ 57.53	Observatory of the University of Alabama.
+ 8 12 50.3	+ 123 12 35	+ 80.96	International Latitude Observatory.
- 1 10 30.15	- 17 37 32.3	- 11.58	University Observatory.
+ 5 52 54.0	+ 88 13 30	+ 57.97	Observatory of the University of Illinois.
- 0 20 31.0	- 5 7 45.0	- 3.37	University Observatory, Sonnenborgh.
- 0 49 22.12	- 12 20 31.8	- 8.11	Observatory of the Nautical Institute.
- 1 5 21.39	- 16 20 20.9	- 10.74	Imperial Univ. Obs. Old Obs. 1' 20'' S., 10°.25 E.
- 1 5 25.3	- 16 21 19.5	- 10.75	Oppolzer Observatory, Josephstadt.
- 1 5 11.11	- 16 17 46.7	- 10.71	Kuffner Observatory, Ottakring.
- 1 24 7.28	- 21 1 49.2	- 13.82	Imperial University Observatory.
+ 5 8 15.78	+ 77 3 56.7	+ 50.64	U. S. Naval Observatory, Georgetown Heights.
+ 5 8 12.15	+ 77 3 2.3	+ 50.63	Old U. S. Naval Observatory. 1842-1893.
+ 5 8 6.2	+ 77 1 33.0	+ 50.61	Smithsonian Astrophysical Observatory.
+ 5 8 0.0	+ 77 0 0.0	+ 50.60	Catholic University Obs., Brookland, D. C.
+ 4 45 13	+ 71 18 15	+ 46.85	Whitin Observatory of Wellesley College.
- 11 39 4.27	- 174 46 4.0	- 114.84	Hector Observatory. Old Obs. 16'' .7 N., 1°.04 E.
+ 4 55 50.55	+ 73 57 38.3	+ 48.60	U. S. Military Academy. Old Obs. 9'' N., 1°.2 E.
- 0 32 35.11	- 8 8 46.7	- 5.35	Imperial Naval Observatory of Germany.
+ 5 54 13.24	+ 88 33 18.6	+ 58.19	Yerkes Observatory of University of Chicago.
+ 4 52 50	+ 73 12 30	+ 48.10	Field Memorial Observatory, Williams College.
- 10 3 20.5	- 150 50 7.5	- 99.11	Mr. John Tebbutt's Observatory.
- 8 4 44.7	- 121 11 10.5	- 79.63	Obs. of the Jesuits near Shanghai.
- 0 34 12.30	- 8 33 4.5	- 5.62	Obs. of the Polytechnic School, Switzerland.

THE COMPUTATION OF LUNAR DISTANCES.

The tables of lunar distances formerly given on pages XIII to XVIII, inclusive, for each month of the Greenwich Ephemeris, are omitted, as it has been decided by the authorities of the Navy Department that they are now of little practical use to navigators. However, in case it is desired to use this method, the angular distance between the Moon and any heavenly body may be calculated by solving the spherical triangle of which the known parts are the polar distances of the Moon and the other body and the difference of their right ascensions, or, in other words, the angle at the pole between their hour-circles. Then, the Greenwich mean time of the observation being approximately known, and the lunar distances for the star or other body calculated for the even hour before and after, the required lunar distance may be interpolated and the longitude derived by the methods given in books on navigation.

EXAMPLE 1.

Find the lunar distance of α Arietis, January 15, 1915, at 6 P. M. Greenwich Mean Time.

Let α and δ = Right Ascension and Declination of the star

" α' and δ' = " " " " " " Moon

" D = Lunar Distance

Also let $\tan M = \tan \delta' \sec (\alpha - \alpha')$

Then $\cos D = \sin \delta' \cos (M - \delta) \operatorname{cosec} M$

$\alpha = 2^h 2^m 23^s.5$	$M = 266^\circ 3' 30''$
$\alpha' = 19^h 55^m 31^s.7$	$\delta = + 23^\circ 3' 52''$
$\alpha - \alpha' = 6^h 6^m 51^s.8$	$M - \delta = 242^\circ 59' 38''$
$\alpha - \alpha' = 91^\circ 42' 57''$	$\sin \delta' = 9.600477 \text{ n}$
$\delta' = -23^\circ 29' 14''$	$\cos (M - \delta) = 9.657137 \text{ n}$
$\tan \delta' = 9.638037 \text{ n}$	$\operatorname{cosec} M = 0.001029 \text{ n}$
$\sec (\alpha - \alpha') = 1.523712 \text{ n}$	$\cos D = 9.258643 \text{ n}$
$\tan M = 1.161749$	$D = 100^\circ 27' 5''$

EXAMPLE 2.

Find the lunar distance of Venus, June 8, 1915, at midnight, Greenwich Mean Time. In this case the distance is smaller and the following method is more accurate:

Let α and δ = Right Ascension and Declination of the planet

" α' and δ' = " " " " " " Moon

" D = Lunar Distance

Also let $\tan N = \tan \frac{1}{2} (\alpha - \alpha') \cos \frac{1}{2} (\delta + \delta') \operatorname{cosec} \frac{1}{2} (\delta - \delta')$

Then $\sin \frac{1}{2} D = \sin \frac{1}{2} (\alpha - \alpha') \cos \frac{1}{2} (\delta + \delta') \operatorname{cosec} N$

$\sin N$ and $\sin \frac{1}{2} (\alpha - \alpha')$ have the same algebraic sign.

$\alpha = 3^h 17^m 57^s.8$	$\tan \frac{1}{2} (\alpha - \alpha') = 9.194835$
$\alpha' = 2^h 6^m 45^s.3$	$\cos \frac{1}{2} (\delta + \delta') = 9.979650$
$\alpha - \alpha' = 1^h 11^m 12^s.5$	$\operatorname{cosec} \frac{1}{2} (\delta - \delta') = 1.945219 \text{ n}$
$\alpha - \alpha' = 17^\circ 48' 8''$	$\tan N = 1.119704 \text{ n}$
$\delta = +16^\circ 45' 12''$	$N = 94^\circ 20' 27''$
$\delta' = +18^\circ 3' 13''$	
$\delta + \delta' = 34^\circ 48' 25''$	$\sin \frac{1}{2} (\alpha - \alpha') = 9.189573$
$\delta - \delta' = - 1^\circ 18' 1''$	$\cos \frac{1}{2} (\delta + \delta') = 9.979650$
	$\operatorname{cosec} N = 0.001247$
$\frac{1}{2} (\alpha - \alpha') = 8^\circ 54' 4''$	$\sin \frac{1}{2} D = 9.170470$
$\frac{1}{2} (\delta + \delta') = 17^\circ 24' 12''$	$\frac{1}{2} D = 8^\circ 30' 55''$
$\frac{1}{2} (\delta - \delta') = - 0^\circ 39' 0''$	$D = 17^\circ 1' 50''$

FOR FINDING THE LATITUDE BY AN OBSERVED ALTITUDE OF POLARIS, 1915.

Reduce the observed altitude of Polaris to the true altitude.

Reduce the recorded time of observation to the local sidereal time.

Take out the App. R. A. and App. Decl. of Polaris for the time of observation (pp. 251-262).

Subtract the App. R. A. from the local sidereal time of observation and the remainder is the hour-angle of Polaris.

With this hour-angle as the vertical argument, and the App. Decl. of Polaris as the horizontal argument, take out the correction from Table I and add it to or subtract it from the true altitude, according to its sign.

For other altitudes than 45° , corrections taken from the supplementary table at the bottom of Table I (Table Ia) may be applied when necessary for the degree of accuracy required.

Example.—1915, August 5, at $10^h 40^m 30^s$ P. M. local mean solar time, in longitude 59° west of Greenwich, suppose the true altitude of Polaris to be $33^\circ 20' 0''$, required the latitude of the place.

Local astronomical mean time	h	m	s
Reduction from Table III for $10^h 40^m 30^s$		+ 1	45
Greenwich sidereal time of mean noon, August 5, page 87	8	51	49
Reduction from Table III, for longitude ($= 3^h 56^m$ west, or plus)		+ 0	39

Sum (having regard to signs) is equal to local sidereal time	h	m	s
R. A. of Polaris (page 258) for time of observation	19	34	43
	1	29	39

Remainder is equal to hour-angle of Polaris	h	m	s
Decl. of Polaris (page 258) for time of observation $88^\circ 51' 6''$	18	5	4
	.	.	.
True altitude	+ 33	20	0
Correction from Table I	- 0	0	50
Correction from Table Ia			- 14

Latitude of the place	.	.	.
	+ 33	18	56

Observations of Polaris for latitude should be made when practicable near the times of upper or of lower culminations (hour-angle 0^h or 12^h). However, at sea, if made near elongation (hour-angle 6^h or 18^h), the hour-angle, and hence the local time, should be known within one minute.

Decl. H. A.	$88^\circ 51' 0''$	$88^\circ 51' 10''$	$88^\circ 51' 20''$	$88^\circ 51' 30''$	$88^\circ 51' 40''$	$88^\circ 51' 50''$	Decl. H. A.
h m	' "	' "	' "	' "	' "	' "	h m
0 0	-69 0	-68 50	-68 40	-68 30	-68 20	-68 10	24 0
3	68 59	68 49	68 40	68 30	68 20	68 10	23 57
6	68 58	68 48	68 39	68 29	68 19	68 9	54
9	68 56	68 46	68 37	68 27	68 17	68 7	51
12	68 54	68 44	68 34	68 24	68 14	68 4	48
15	-68 51	-68 41	-68 31	-68 21	-68 11	-68 1	23 45
18	68 47	68 37	68 27	68 17	68 7	67 57	42
21	68 42	68 32	68 22	68 12	68 2	67 52	39
24	68 36	68 27	68 17	68 7	67 57	67 47	36
27	68 30	68 21	68 11	68 1	67 51	67 41	33
30	-68 23	-68 14	-68 4	-67 54	-67 44	-67 34	23 30
33	68 16	68 6	67 56	67 47	67 37	67 27	27
36	68 8	67 58	67 48	67 39	67 29	67 19	24
39	67 59	67 49	67 39	67 30	67 20	67 10	21
42	67 49	67 39	67 30	67 20	67 10	67 0	18
45	-67 38	-67 29	-67 19	-67 10	-67 0	-66 50	23 15
48	67 27	67 18	67 8	66 59	66 49	66 39	12
51	67 15	67 6	66 56	66 47	66 37	66 27	9
54	67 2	66 53	66 44	66 34	66 24	66 15	6
57	66 49	66 40	66 31	66 21	66 11	66 2	3
1 0	-66 35	-66 26	-66 17	-66 7	-65 58	-65 48	23 0
3	66 21	66 12	66 2	65 53	65 43	65 34	22 57
6	66 6	65 57	65 47	65 38	65 28	65 18	54
9	65 50	65 41	65 31	65 22	65 12	65 2	51
12	-65 33	-65 24	-65 14	-65 5	-64 56	-64 46	22 48

FOR FINDING THE LATITUDE BY AN OBSERVED ALTITUDE OF POLARIS, 1915.

Decl. H. A.	88° 51' 0"	88° 51' 10"	88° 51' 20"	88° 51' 30"	88° 51' 40"	88° 51' 50"	Decl. H. A.
h m	' "	' "	' "	' "	' "	' "	h m
1 12	-65 33 18	-65 24 18	-65 14 17	-65 5 17	-64 56 18	-64 46 17	22 48
15	65 15 18	65 6 18	64 57 18	64 48 18	64 38 18	64 29 18	45
18	64 57 18	64 48 18	64 39 19	64 30 19	64 20 18	64 11 19	42
21	64 39 20	64 30 20	64 20 19	64 11 19	64 2 20	63 52 19	39
24	64 19 20	64 10 20	64 1 20	63 52 20	63 42 20	63 33 20	36
1 27	-63 59 20	-63 50 20	-63 41 21	-63 32 21	-63 22 20	-63 13 20	22 33
30	63 39 22	63 30 22	63 20 21	63 11 21	63 2 21	62 53 21	30
33	63 17 22	63 8 22	62 59 22	62 50 22	62 41 22	62 32 22	27
36	62 55 23	62 46 23	62 37 23	62 28 23	62 19 23	62 10 24	24
39	62 32 23	62 23 23	62 14 23	62 5 23	61 56 23	61 47 23	21
1 42	-62 9 24	-62 0 24	-61 51 24	-61 42 24	-61 33 24	-61 24 24	22 18
45	61 45 25	61 36 24	61 27 25	61 18 24	61 9 24	61 0 25	15
48	61 20 25	61 12 24	61 2 25	60 54 24	60 45 25	60 35 25	12
51	60 55 26	60 46 26	60 37 26	60 29 26	60 20 26	60 10 25	9
54	60 29 27	60 20 26	60 11 26	60 3 27	59 54 26	59 45 26	6
1 57	-60 2 27	-59 54 27	-59 45 27	-59 36 27	-59 28 27	-59 19 27	22 3
2 0	59 35 28	59 27 28	59 18 28	59 9 28	59 1 28	58 52 28	22 0
3	59 7 29	58 59 29	58 50 28	58 41 28	58 33 28	58 24 28	21 57
6	58 38 29	58 30 29	58 22 29	58 13 29	58 5 29	57 56 28	54
9	58 9 29	58 1 29	57 53 30	57 44 29	57 36 29	57 28 30	51
2 12	-57 40 31	-57 32 31	-57 23 30	-57 15 30	-57 7 30	-56 58 30	21 46
15	57 9 31	57 1 31	56 53 31	56 45 31	56 37 31	56 28 30	45
18	56 38 31	56 30 31	56 22 31	56 14 31	56 6 31	55 58 30	42
21	56 7 31	55 59 32	55 51 32	55 43 32	55 35 32	55 27 32	39
24	55 35 33	55 27 33	55 19 33	55 11 32	55 3 32	54 55 32	36
2 27	-55 2 33	-54 54 33	-54 46 33	-54 39 33	-54 31 33	-54 23 33	21 33
30	54 29 34	54 21 33	54 13 33	54 6 33	53 58 33	53 50 33	30
33	53 55 34	53 48 33	53 40 33	53 32 34	53 24 34	53 16 34	27
36	53 20 35	53 13 35	53 6 34	52 58 34	52 50 34	52 42 34	24
39	52 46 36	52 39 36	52 31 35	52 23 35	52 16 34	52 8 34	21
2 42	-52 10 36	-52 3 36	-51 56 36	-51 48 36	-51 41 36	-51 33 35	21 18
45	51 34 36	51 27 36	51 20 36	51 12 36	51 5 36	50 58 35	15
48	50 58 37	50 51 37	50 43 37	50 36 37	50 29 37	50 22 36	12
51	50 21 38	50 14 38	50 6 37	49 59 37	49 52 37	49 45 37	9
54	49 43 38	49 36 38	49 29 37	49 22 37	49 15 37	49 8 37	6
2 57	-49 5 38	-48 58 38	-48 51 38	-48 44 38	-48 37 38	-48 30 38	21 3
3 0	48 27 39	48 20 39	48 13 39	48 6 39	47 59 39	47 52 39	21 0
3	47 48 39	47 41 39	47 34 39	47 27 39	47 20 39	47 13 39	20 57
6	47 8 40	47 1 40	46 55 39	46 48 39	46 41 39	46 34 39	54
9	46 28 40	46 22 39	46 15 41	46 8 40	46 1 40	45 55 40	51
3 12	-45 47 41	-45 41 41	-45 34 41	-45 28 41	-45 21 41	-45 15 41	20 46
15	45 6 42	45 0 42	44 53 41	44 47 41	44 40 41	44 34 41	45
18	44 24 42	44 18 41	44 12 42	44 6 42	43 59 41	43 53 41	42
21	43 42 42	43 37 41	43 30 42	43 24 42	43 18 41	43 12 41	39
24	43 0 42	42 54 42	42 48 42	42 42 42	42 36 42	42 30 42	36
3 27	-42 17 43	-42 12 44	-42 5 43	-41 59 43	-41 53 43	-41 47 43	20 33
30	41 34 44	41 28 44	41 22 43	41 16 43	41 10 43	41 4 43	30
33	40 50 44	40 45 43	40 39 43	40 33 43	40 27 43	40 21 43	27
36	40 6 44	40 1 44	39 55 44	39 49 44	39 44 44	39 38 43	24
39	39 21 45	39 16 45	39 11 45	39 5 45	39 00 45	38 54 45	21
3 42	-38 36 45	-38 31 45	-38 26 45	-38 20 45	-38 15 45	-38 9 45	20 18
45	37 51 46	37 46 46	37 41 46	37 35 45	37 30 45	37 24 45	15
48	37 5 46	37 0 46	36 55 46	36 50 45	36 45 45	36 39 45	12
51	36 19 46	36 14 46	36 9 46	36 4 46	35 59 46	35 54 46	9
54	35 33 47	35 28 47	35 23 47	35 18 47	35 13 46	35 8 46	6
3 57	-34 46 47	-34 41 47	-34 36 47	-34 31 47	-34 27 47	-34 22 47	20 3
4 0	33 59 48	33 54 47	33 49 47	33 44 47	33 40 47	33 35 47	20 0
3	33 11 48	33 7 47	33 2 47	32 57 47	32 53 47	32 48 47	19 57
6	32 23 48	32 19 48	32 14 48	32 10 47	32 5 48	32 0 48	54
4 9	-31 35 48	-31 31 48	-31 26 48	-31 22 48	-31 17 48	-31 13 47	19 51

FOR FINDING THE LATITUDE BY AN OBSERVED ALTITUDE OF POLARIS, 1915.

Decl. H. A.	88° 51' 0"	88° 51' 10"	88° 51' 20"	88° 51' 30"	88° 51' 40"	88° 51' 50"	Decl. H. A.
h m	' "	' "	' "	' "	' "	' "	h m
4 9	-31 35 49	-31 31 49	-31 26 48	-31 22 48	-31 17 48	-31 13 48	19 51
12	30 46 48	30 42 48	30 38 48	30 34 49	30 29 48	30 25 48	48
15	29 58 48	29 54 48	29 49 49	29 45 49	29 41 48	29 36 49	45
18	29 9 49	29 5 49	29 0 49	28 56 49	28 52 49	28 47 48	42
21	28 19 50	28 15 49	28 11 49	28 7 49	28 3 49	27 59 49	39
4 24	-27 29 50	-27 26 50	-27 22 50	-27 18 50	-27 14 50	-27 10 50	19 36
27	26 39 51	26 36 51	26 32 50	26 28 50	26 24 50	26 20 50	33
30	25 48 50	25 45 50	25 42 51	25 38 50	25 34 50	25 31 50	30
33	24 58 50	24 55 51	24 51 50	24 48 50	24 44 50	24 41 50	27
36	24 7 51	24 4 51	24 1 51	23 57 50	23 54 51	23 51 51	24
4 39	-23 16 52	-23 13 51	-23 10 51	-23 7 51	-23 3 51	-23 0 51	19 21
42	22 24 51	22 22 51	22 19 52	22 16 51	22 12 51	22 9 51	18
45	21 33 51	21 31 52	21 27 51	21 25 51	21 21 51	21 18 51	15
48	20 41 52	20 39 52	20 36 52	20 33 52	20 30 51	20 27 51	12
51	19 49 52	19 47 52	19 44 52	19 42 52	19 39 52	19 36 52	9
4 54	-18 57 52	-18 55 52	-18 52 52	-18 50 52	-18 47 52	-18 44 51	19 6
4 57	18 5 53	18 3 53	18 0 52	17 58 52	17 55 52	17 53 52	3
5 0	17 12 53	17 10 52	17 8 52	17 6 52	17 3 52	17 1 52	19 0
3	16 20 52	16 18 52	16 16 52	16 13 53	16 11 52	16 9 52	18 57
6	15 27 53	15 25 53	15 23 53	15 21 53	15 19 52	15 17 53	54
5 9	-14 34 53	-14 32 53	-14 30 53	-14 28 52	-14 27 53	-14 24 52	18 51
12	13 41 53	13 39 53	13 37 53	13 36 53	13 34 53	13 32 53	48
15	12 48 53	12 46 53	12 44 53	12 43 53	12 41 53	12 39 53	45
18	11 54 54	11 53 53	11 51 53	11 50 53	11 48 53	11 46 53	42
21	11 0 54	10 59 53	10 58 53	10 56 54	10 55 53	10 53 53	39
5 24	-10 7 54	-10 6 54	-10 4 53	-10 3 53	-10 2 53	-10 0 53	18 36
27	9 13 54	9 12 54	9 11 54	9 10 54	9 9 53	9 7 53	33
30	8 19 54	8 18 54	8 17 54	8 16 54	8 16 53	8 14 53	30
33	7 26 53	7 25 53	7 24 53	7 23 53	7 22 54	7 21 53	27
36	6 32 54	6 31 54	6 30 54	6 29 54	6 28 54	6 28 53	24
5 39	-5 38 55	-5 37 54	-5 36 54	-5 35 53	-5 35 54	-5 34 53	18 21
42	4 43 54	4 43 54	4 42 54	4 42 53	4 41 54	4 41 53	18
45	3 49 54	3 49 54	3 48 54	3 48 54	3 48 53	3 48 53	15
48	2 55 54	2 55 54	2 55 53	2 54 54	2 54 54	2 54 54	12
51	2 1 55	2 1 54	2 1 54	2 1 53	2 0 53	2 0 54	9
5 54	-1 6 54	-1 7 54	-1 7 54	-1 7 54	-1 7 54	-1 6 53	18 6
5 57	0 13 54	0 13 54	0 13 54	0 13 54	0 13 54	0 13 54	3
6 0	+0 42 53	+0 41 54	+0 41 54	+0 41 54	+0 41 53	+0 41 53	18 0
3	1 35 54	1 35 54	1 35 54	1 35 53	1 34 54	1 34 54	17 57
6	2 29 55	2 29 54	2 29 54	2 28 53	2 28 54	2 28 54	54
6 9	+3 24 54	+3 23 54	+3 23 54	+3 22 54	+3 22 53	+3 21 54	17 51
12	4 18 54	4 17 54	4 17 53	4 16 54	4 15 53	4 15 54	48
15	5 12 54	5 11 54	5 10 54	5 9 53	5 9 53	5 8 53	45
18	6 6 54	6 5 54	6 4 54	6 3 54	6 2 53	6 1 53	42
21	7 0 54	6 59 54	6 58 53	6 56 53	6 56 54	6 54 54	39
6 24	+7 54 53	+7 53 53	+7 51 54	+7 50 53	+7 49 53	+7 48 53	17 36
27	8 47 54	8 46 54	8 45 53	8 43 54	8 42 53	8 41 53	33
30	9 41 54	9 40 54	9 38 53	9 37 54	9 35 53	9 34 53	30
33	10 35 54	10 33 53	10 32 54	10 30 53	10 28 53	10 27 53	27
36	11 28 53	11 26 53	11 25 53	11 23 53	11 21 53	11 19 53	24
6 39	+12 22 54	+12 20 53	+12 18 52	+12 16 52	+12 14 53	+12 12 53	17 21
42	13 16 53	13 13 53	13 10 53	13 8 52	13 7 52	13 5 52	18
45	14 9 53	14 6 53	14 3 53	14 1 53	13 59 53	13 57 52	15
48	15 1 52	14 58 52	14 56 53	14 54 53	14 52 53	14 49 52	12
51	15 54 52	15 51 53	15 48 52	15 46 52	15 44 52	15 41 52	9
6 54	+16 46 52	+16 44 52	+16 41 52	+16 38 52	+16 36 52	+16 33 52	17 6
6 57	17 38 52	17 36 52	17 33 52	17 30 52	17 28 51	17 25 51	17 3
7 0	18 30 52	18 28 52	18 25 52	18 22 52	18 19 51	18 16 51	17 0
3	19 22 52	19 20 52	19 16 51	19 14 52	19 11 52	19 8 52	16 57
7 6	+20 14 52	+20 11 51	+20 8 52	+20 5 51	+20 2 51	+19 59 51	16 54

FOR FINDING THE LATITUDE BY AN OBSERVED ALTITUDE OF POLARIS, 1915.

Decl. H. A.	88° 51' 0"	88° 51' 10"	88° 51' 20"	88° 51' 30"	88° 51' 40"	88° 51' 50"	Decl. H. A.
h m	' "	' "	' "	' "	' "	' "	h m
7 6	+20 14 52	+20 11 52	+20 8 51	+20 5 51	+20 2 51	+19 59 51	16 54
9	21 6 51	21 3 51	20 59 51	20 56 51	20 53 51	20 50 51	51
12	21 57 51	21 54 51	21 50 51	21 47 51	21 44 51	21 41 51	48
15	22 48 51	22 45 51	22 41 51	22 38 50	22 35 50	22 31 50	45
18	23 39 51	23 36 50	23 32 50	23 28 51	23 25 50	23 21 50	42
7 21	+24 30 50	+24 26 50	+24 22 50	+24 19 50	+24 15 50	+24 11 50	16 39
24	25 20 50	25 16 50	25 12 50	25 9 50	25 5 50	25 1 50	36
27	26 10 50	26 6 50	26 2 50	25 58 49	25 55 49	25 51 49	33
30	27 0 50	26 56 49	26 52 49	26 48 49	26 44 49	26 40 49	30
33	27 49 49	27 45 49	27 41 49	27 37 49	27 33 49	27 30 48	27
7 36	+28 38 49	+28 34 49	+28 30 49	+28 26 48	+28 22 48	+28 18 48	16 24
39	29 27 49	29 23 49	29 19 49	29 14 49	29 10 48	29 6 48	21
42	30 16 49	30 12 49	30 7 48	30 3 49	29 58 48	29 54 48	18
45	31 4 48	31 0 48	30 55 48	30 51 47	30 46 48	30 42 47	15
48	31 52 48	31 48 48	31 43 48	31 38 48	31 34 47	31 29 47	12
7 51	+32 40 47	+32 36 47	+32 31 47	+32 26 47	+32 21 47	+32 16 47	16 9
54	33 27 47	33 23 47	33 18 47	33 13 46	33 8 47	33 3 47	6
7 57	34 14 47	34 10 46	34 5 46	33 59 47	33 55 46	33 50 46	3
8 0	35 1 46	34 56 46	34 51 46	34 46 46	34 41 46	34 36 46	16 0
3	35 47 46	35 42 46	35 37 46	35 32 45	35 27 45	35 21 46	15 57
8 6	+36 33 46	+36 28 46	+36 23 45	+36 17 45	+36 12 45	+36 7 45	15 54
9	37 19 45	37 14 45	37 8 45	37 2 45	36 57 45	36 52 44	51
12	38 4 45	37 59 44	37 53 44	37 47 45	37 42 44	37 36 44	48
15	38 49 44	38 43 44	38 37 44	38 32 45	38 26 44	38 20 44	45
18	39 33 44	39 28 43	39 22 43	39 16 43	39 10 44	39 4 44	42
8 21	+40 17 43	+40 11 44	+40 5 44	+39 59 44	+39 54 43	+39 48 43	15 39
24	41 0 43	40 55 43	40 49 43	40 43 43	40 37 43	40 31 42	36
27	41 43 43	41 38 43	41 32 42	41 26 43	41 20 43	41 13 42	33
30	42 26 43	42 20 42	42 14 42	42 8 42	42 2 42	41 55 42	30
33	43 8 42	43 3 41	42 56 42	42 50 41	42 44 41	42 37 42	27
8 36	+43 50 42	+43 44 42	+43 38 41	+43 31 41	+43 25 41	+43 19 41	15 24
39	44 32 40	44 26 40	44 19 41	44 12 41	44 6 40	44 0 40	21
42	45 12 40	45 6 40	45 0 40	44 53 40	44 46 40	44 40 40	18
45	45 53 40	45 47 41	45 40 40	45 33 40	45 26 40	45 20 40	15
48	46 33 40	46 27 39	46 20 39	46 13 39	46 6 39	45 59 39	12
8 51	+47 13 39	+47 6 39	+46 59 39	+46 52 39	+46 45 39	+46 38 39	15 9
54	47 52 38	47 45 38	47 38 38	47 31 38	47 24 38	47 17 38	6
8 57	48 30 38	48 23 38	48 16 38	48 9 38	48 2 38	47 55 38	3
9 0	49 8 38	49 1 38	48 54 38	48 47 37	48 40 37	48 33 37	15 0
3	49 46 37	49 39 37	49 31 37	49 24 37	49 17 37	49 10 36	14 57
9 6	+50 23 36	+50 16 36	+50 8 36	+50 1 36	+49 54 36	+49 46 36	14 54
9	50 59 36	50 52 36	50 44 36	50 37 36	50 30 36	50 22 36	51
12	51 35 35	51 28 36	51 20 36	51 13 36	51 5 35	50 58 36	48
15	52 10 35	52 3 35	51 55 35	51 48 35	51 40 35	51 33 35	45
18	52 45 34	52 38 35	52 30 35	52 23 35	52 15 35	52 7 34	42
9 21	+53 19 34	+53 12 34	+53 4 34	+52 57 33	+52 49 34	+52 41 34	14 39
24	53 53 34	53 46 34	53 38 34	53 30 33	53 23 33	53 15 33	36
27	54 26 33	54 19 33	54 11 33	54 3 33	53 56 32	53 48 32	33
30	54 59 33	54 52 32	54 44 32	54 36 32	54 28 32	54 20 32	30
33	55 32 32	55 24 32	55 16 31	55 8 31	55 0 31	54 52 31	27
9 36	+56 4 31	+55 56 31	+55 47 31	+55 39 31	+55 31 31	+55 23 31	14 24
39	56 35 30	56 27 30	56 18 31	56 10 30	56 2 31	55 54 30	21
42	57 5 30	56 57 30	56 49 30	56 40 30	56 32 30	56 24 29	18
45	57 35 29	57 27 29	57 19 29	57 10 29	57 2 29	56 53 29	15
48	58 4 29	57 56 29	57 48 28	57 39 29	57 31 28	57 22 29	12
9 51	+58 33 28	+58 25 28	+58 16 28	+58 8 28	+57 59 28	+57 51 28	14 9
54	59 1 27	58 53 27	58 44 28	58 36 27	58 27 27	58 19 27	6
9 57	59 28 27	59 20 27	59 12 27	59 3 27	58 54 27	58 46 27	3
10 0	59 55 26	59 47 26	59 39 26	59 30 26	59 21 26	59 12 26	14 0
10 3	+60 21 26	+60 13 26	+60 5 26	+59 56 26	+59 47 26	+59 38 26	13 51

[Eph 15]

TABLE I.

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FOR FINDING THE LATITUDE BY AN OBSERVED ALTITUDE OF POLARIS, 1915.

Decl. H. A.	88° 51' 0''	88° 51' 10''	88° 51' 20''	88° 51' 30''	88° 51' 40''	88° 51' 50''	Decl. H. A.
h m	' "	' "	' "	' "	' "	' "	h m
10 3	+60 21 26	+60 13 26	+60 5 25	+59 56 25	+59 47 26	+59 38 26	13 57
6	60 47 25	60 39 25	60 30 25	60 21 25	60 13 24	60 4 24	54
9	61 12 25	61 4 24	60 55 24	60 46 24	60 37 24	60 28 24	51
12	61 37 25	61 28 24	61 19 24	61 10 24	61 2 25	60 53 25	48
15	62 1 24	61 52 24	61 43 24	61 34 24	61 25 23	61 16 23	45
	62 1 23	61 52 23	61 43 23	61 34 23	61 25 23	61 16 23	
10 18	+62 24 23	+62 15 23	+62 6 23	+61 57 22	+61 48 23	+61 39 23	13 42
21	62 47 22	62 38 23	62 29 23	62 19 22	62 11 23	62 2 21	39
24	63 9 21	63 0 21	62 51 21	62 41 21	62 32 21	62 23 21	36
27	63 30 21	63 21 21	63 12 21	63 2 21	62 53 21	62 44 21	33
30	63 51 20	63 42 20	63 33 20	63 23 20	63 14 20	63 5 19	30
10 33	+64 11 19	+64 2 19	+63 53 19	+63 43 19	+63 34 19	+63 24 20	13 27
36	64 30 19	64 21 19	64 12 18	64 2 19	63 53 19	63 44 18	24
39	64 49 18	64 40 18	64 30 18	64 21 18	64 12 19	64 2 18	21
42	65 7 18	64 58 17	64 48 17	64 39 17	64 29 18	64 20 17	18
45	65 25 17	65 15 17	65 5 17	64 56 17	64 47 16	64 37 17	15
10 48	+65 42 16	+65 32 16	+65 22 16	+65 13 16	+65 3 16	+64 54 16	13 12
51	65 58 15	65 48 15	65 38 15	65 29 15	65 19 15	65 10 15	9
54	66 13 15	66 3 15	65 53 15	65 44 15	65 34 15	65 25 15	6
10 57	66 28 14	66 18 14	66 8 14	65 59 14	65 49 14	65 40 14	3
11 0	66 42 13	66 32 13	66 22 13	66 13 13	66 3 13	65 54 13	13 0
11 3	+66 55 13	+66 45 13	+66 35 13	+66 26 13	+66 16 13	+66 7 12	12 57
6	67 8 12	66 58 12	66 48 12	66 39 12	66 29 12	66 19 12	54
9	67 20 11	67 10 12	67 0 12	66 51 11	66 41 11	66 31 11	51
12	67 31 11	67 22 10	67 12 11	67 2 11	66 52 11	66 42 11	48
15	67 42 10	67 32 10	67 23 10	67 13 10	67 3 10	66 53 10	45
11 18	+67 52 9	+67 42 10	+67 33 9	+67 23 9	+67 13 9	+67 3 9	12 42
21	68 1 9	67 52 8	67 42 8	67 32 8	67 22 8	67 12 8	39
24	68 10 8	68 0 8	67 50 8	67 40 8	67 30 8	67 20 8	36
27	68 18 8	68 8 7	67 58 7	67 48 7	67 38 8	67 28 8	33
30	68 25 7	68 15 7	68 5 7	67 55 7	67 46 6	67 36 6	30
11 33	+68 32 6	+68 22 6	+68 12 6	+68 2 6	+67 52 6	+67 42 6	12 27
36	68 38 5	68 28 5	68 18 5	68 8 5	67 58 5	67 48 5	24
39	68 43 4	68 33 5	68 23 5	68 13 4	68 3 5	67 53 5	21
42	68 47 4	68 38 5	68 28 5	68 17 4	68 8 5	67 58 5	18
45	68 51 3	68 41 3	68 32 4	68 21 4	68 11 3	68 1 3	15
11 48	+68 54 2	+68 44 3	+68 35 2	+68 24 3	+68 14 3	+68 4 3	12 12
51	68 56 2	68 47 2	68 37 2	68 27 2	68 17 2	68 7 2	9
54	68 58 1	68 49 1	68 39 1	68 29 1	68 19 1	68 9 1	6
11 57	68 59 1	68 49 1	68 40 1	68 30 1	68 20 1	68 10 1	3
12 0	+69 0 0	+68 50 0	+68 40 0	+68 30 0	+68 20 0	+68 10 0	12 0

TABLE Ia.

Table I has been computed for an altitude of 45°. For other altitudes, corrections taken from the following table may be applied when the desired degree of accuracy requires it.

Altitude.		10°	20°	30°	40°	50°	60°	70°	Altitude.	
H. A.									H. A.	
h	h	"	"	"	"	"	"	"	h	h
0	12	0	0	0	0	0	0	0	12	24
1	11	- 2	- 2	- 1	0	0	+ 2	+ 5	13	23
2	10	8	7	4	- 2	+ 2	8	18	14	22
3	9	17	13	9	3	4	15	36	15	21
4	8	25	20	13	5	6	23	54	16	20
5	7	32	24	16	6	7	28	67	17	19
6	6	-34	-26	-17	-7	+8	+30	+72	18	18

[Eph 15]

TO BE SUBTRACTED FROM A SIDEREAL TIME INTERVAL.

Sidereal.	0 ^h		1 ^h		2 ^h		3 ^h		4 ^h		5 ^h		6 ^h		7 ^h		For Seconds.	
m	m	s	m	s	m	s	m	s	m	s	m	s	m	s	m	s	s	s
0	0	0.000	0	9.830	0	19.659	0	29.489	0	39.318	0	49.148	0	58.977	1	8.807	0	0.000
1	0	0.164	0	9.993	0	19.823	0	29.653	0	39.482	0	49.312	0	59.141	1	8.971	1	0.003
2	0	0.328	0	10.157	0	19.987	0	29.816	0	39.646	0	49.475	0	59.305	1	9.135	2	0.005
3	0	0.491	0	10.321	0	20.151	0	29.980	0	39.810	0	49.639	0	59.469	1	9.298	3	0.008
4	0	0.655	0	10.485	0	20.314	0	30.144	0	39.974	0	49.803	0	59.633	1	9.462	4	0.011
5	0	0.819	0	10.649	0	20.478	0	30.308	0	40.137	0	49.967	0	59.796	1	9.626	5	0.014
6	0	0.983	0	10.813	0	20.642	0	30.472	0	40.301	0	50.131	0	59.960	1	9.790	6	0.016
7	0	1.147	0	10.976	0	20.806	0	30.635	0	40.465	0	50.295	1	0.124	1	9.954	7	0.010
8	0	1.311	0	11.140	0	20.970	0	30.799	0	40.629	0	50.458	1	0.288	1	10.118	8	0.022
9	0	1.474	0	11.304	0	21.134	0	30.963	0	40.793	0	50.622	1	0.452	1	10.281	9	0.025
10	0	1.638	0	11.468	0	21.297	0	31.127	0	40.956	0	50.786	1	0.616	1	10.445	10	0.027
11	0	1.802	0	11.632	0	21.461	0	31.291	0	41.120	0	50.950	1	0.779	1	10.609	11	0.030
12	0	1.966	0	11.795	0	21.625	0	31.455	0	41.284	0	51.114	1	0.943	1	10.773	12	0.033
13	0	2.130	0	11.959	0	21.789	0	31.618	0	41.448	0	51.278	1	1.107	1	10.937	13	0.035
14	0	2.294	0	12.123	0	21.953	0	31.782	0	41.612	0	51.441	1	1.271	1	11.100	14	0.038
15	0	2.457	0	12.287	0	22.117	0	31.946	0	41.776	0	51.605	1	1.435	1	11.264	15	0.041
16	0	2.621	0	12.451	0	22.280	0	32.110	0	41.939	0	51.769	1	1.599	1	11.428	16	0.044
17	0	2.785	0	12.615	0	22.444	0	32.274	0	42.103	0	51.933	1	1.762	1	11.592	17	0.046
18	0	2.949	0	12.778	0	22.608	0	32.438	0	42.267	0	52.097	1	1.926	1	11.756	18	0.049
19	0	3.113	0	12.942	0	22.772	0	32.601	0	42.431	0	52.260	1	2.090	1	11.920	19	0.052
20	0	3.277	0	13.106	0	22.936	0	32.765	0	42.595	0	52.424	1	2.254	1	12.083	20	0.055
21	0	3.440	0	13.270	0	23.099	0	32.929	0	42.759	0	52.588	1	2.418	1	12.247	21	0.057
22	0	3.604	0	13.434	0	23.263	0	33.093	0	42.922	0	52.752	1	2.582	1	12.411	22	0.060
23	0	3.768	0	13.598	0	23.427	0	33.257	0	43.086	0	52.916	1	2.745	1	12.575	23	0.063
24	0	3.932	0	13.761	0	23.591	0	33.420	0	43.250	0	53.080	1	2.909	1	12.739	24	0.066
25	0	4.096	0	13.925	0	23.755	0	33.584	0	43.414	0	53.243	1	3.073	1	12.903	25	0.068
26	0	4.259	0	14.089	0	23.919	0	33.748	0	43.578	0	53.407	1	3.237	1	13.066	26	0.071
27	0	4.423	0	14.253	0	24.082	0	33.912	0	43.742	0	53.571	1	3.401	1	13.230	27	0.074
28	0	4.587	0	14.417	0	24.246	0	34.076	0	43.905	0	53.735	1	3.564	1	13.394	28	0.076
29	0	4.751	0	14.581	0	24.410	0	34.240	0	44.069	0	53.899	1	3.728	1	13.558	29	0.079
30	0	4.915	0	14.744	0	24.574	0	34.403	0	44.233	0	54.063	1	3.892	1	13.722	30	0.082
31	0	5.079	0	14.908	0	24.738	0	34.567	0	44.397	0	54.226	1	4.056	1	13.886	31	0.085
32	0	5.242	0	15.072	0	24.902	0	34.731	0	44.561	0	54.390	1	4.220	1	14.049	32	0.087
33	0	5.406	0	15.236	0	25.065	0	34.895	0	44.724	0	54.554	1	4.384	1	14.213	33	0.090
34	0	5.570	0	15.400	0	25.229	0	35.059	0	44.888	0	54.718	1	4.547	1	14.377	34	0.093
35	0	5.734	0	15.563	0	25.393	0	35.223	0	45.052	0	54.882	1	4.711	1	14.541	35	0.096
36	0	5.898	0	15.727	0	25.557	0	35.386	0	45.216	0	55.046	1	4.875	1	14.705	36	0.098
37	0	6.062	0	15.891	0	25.721	0	35.550	0	45.380	0	55.209	1	5.039	1	14.868	37	0.101
38	0	6.225	0	16.055	0	25.885	0	35.714	0	45.544	0	55.372	1	5.203	1	15.032	38	0.104
39	0	6.389	0	16.219	0	26.048	0	35.878	0	45.707	0	55.537	1	5.367	1	15.196	39	0.106
40	0	6.553	0	16.383	0	26.212	0	36.042	0	45.871	0	55.701	1	5.530	1	15.360	40	0.109
41	0	6.717	0	16.546	0	26.376	0	36.206	0	46.035	0	55.865	1	5.694	1	15.524	41	0.112
42	0	6.881	0	16.710	0	26.540	0	36.369	0	46.199	0	56.028	1	5.858	1	15.688	42	0.115
43	0	7.045	0	16.874	0	26.704	0	36.533	0	46.363	0	56.192	1	6.022	1	15.851	43	0.117
44	0	7.208	0	17.038	0	26.867	0	36.697	0	46.527	0	56.356	1	6.186	1	16.015	44	0.120
45	0	7.372	0	17.202	0	27.031	0	36.861	0	46.690	0	56.520	1	6.350	1	16.179	45	0.123
46	0	7.536	0	17.366	0	27.195	0	37.025	0	46.854	0	56.684	1	6.513	1	16.343	46	0.126
47	0	7.700	0	17.529	0	27.359	0	37.188	0	47.018	0	56.848	1	6.677	1	16.507	47	0.128
48	0	7.864	0	17.693	0	27.523	0	37.352	0	47.182	0	57.011	1	6.841	1	16.671	48	0.131
49	0	8.027	0	17.857	0	27.687	0	37.516	0	47.346	0	57.175	1	7.005	1	16.834	49	0.134
50	0	8.191	0	18.021	0	27.850	0	37.680	0	47.510	0	57.339	1	7.169	1	16.998	50	0.137
51	0	8.355	0	18.185	0	28.014	0	37.844	0	47.673	0	57.503	1	7.332	1	17.162	51	0.139
52	0	8.519	0	18.349	0	28.178	0	38.008	0	47.837	0	57.667	1	7.496	1	17.326	52	0.142
53	0	8.683	0	18.512	0	28.342	0	38.171	0	48.001	0	57.831	1	7.660	1	17.490	53	0.145
54	0	8.847	0	18.676	0	28.506	0	38.335	0	48.165	0	57.994	1	7.824	1	17.654	54	0.147
55	0	9.010	0	18.840	0	28.670	0	38.499	0	48.329	0	58.158	1	7.988	1	17.817	55	0.150
56	0	9.174	0	19.004	0	28.833	0	38.663	0	48.492	0	58.322	1	8.152	1	17.981	56	0.153
57	0	9.338	0	19.168	0	28.997	0	38.827	0	48.656	0	58.486	1	8.315	1	18.145	57	0.156
58	0	9.502	0	19.331	0	29.161	0	38.991	0	48.820	0	58.650	1	8.479	1	18.309	58	0.158
59	0	9.666	0	19.495	0	29.325	0	39.154	0	48.984	0	58.814	1	8.643	1	18.473	59	0.161

Sidereal.	0 ^h		1 ^h		2 ^h		3 ^h		4 ^h		5 ^h		6 ^h		7 ^h		For Seconds.	
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TO BE SUBTRACTED FROM A SIDEREAL TIME INTERVAL.

Side- real.	8 ^h	9 ^h	10 ^h	11 ^h	12 ^h	13 ^h	14 ^h	15 ^h	For Seconds.
m	m s	m s	m s	m s	m s	m s	m s	m s	s s
0	1 18.636	1 28.466	1 38.296	1 48.125	1 57.955	2 7.784	2 17.614	2 27.443	0 0.000
1	1 18.800	1 28.630	1 38.459	1 48.289	1 58.119	2 7.948	2 17.778	2 27.607	1 0.003
2	1 18.964	1 28.794	1 38.623	1 48.453	1 58.282	2 8.112	2 17.941	2 27.771	2 0.005
3	1 19.128	1 28.958	1 38.787	1 48.617	1 58.446	2 8.276	2 18.105	2 27.935	3 0.008
4	1 19.292	1 29.121	1 38.951	1 48.780	1 58.610	2 8.440	2 18.269	2 28.099	4 0.011
5	1 19.456	1 29.285	1 39.115	1 48.944	1 58.774	2 8.603	2 18.433	2 28.263	5 0.014
6	1 19.619	1 29.449	1 39.279	1 49.108	1 58.938	2 8.767	2 18.597	2 28.426	6 0.016
7	1 19.783	1 29.613	1 39.442	1 49.272	1 59.101	2 8.931	2 18.761	2 28.590	7 0.019
8	1 19.947	1 29.777	1 39.606	1 49.436	1 59.265	2 9.095	2 18.924	2 28.754	8 0.022
9	1 20.111	1 29.940	1 39.770	1 49.600	1 59.429	2 9.259	2 19.088	2 28.918	9 0.025
10	1 20.275	1 30.104	1 39.934	1 49.763	1 59.593	2 9.423	2 19.252	2 29.082	10 0.027
11	1 20.439	1 30.268	1 40.098	1 49.927	1 59.757	2 9.586	2 19.416	2 29.245	11 0.030
12	1 20.602	1 30.432	1 40.261	1 50.091	1 59.921	2 9.750	2 19.580	2 29.409	12 0.033
13	1 20.766	1 30.596	1 40.425	1 50.255	2 0.084	2 9.914	2 19.744	2 29.573	13 0.035
14	1 20.930	1 30.760	1 40.589	1 50.419	2 0.248	2 10.078	2 19.907	2 29.737	14 0.038
15	1 21.094	1 30.923	1 40.753	1 50.583	2 0.412	2 10.242	2 20.071	2 29.901	15 0.041
16	1 21.258	1 31.087	1 40.917	1 50.746	2 0.576	2 10.405	2 20.235	2 30.065	16 0.044
17	1 21.422	1 31.251	1 41.081	1 50.910	2 0.740	2 10.569	2 20.399	2 30.228	17 0.046
18	1 21.585	1 31.415	1 41.244	1 51.074	2 0.904	2 10.733	2 20.563	2 30.392	18 0.049
19	1 21.749	1 31.579	1 41.408	1 51.238	2 1.067	2 10.897	2 20.727	2 30.556	19 0.052
20	1 21.913	1 31.743	1 41.572	1 51.402	2 1.231	2 11.061	2 20.890	2 30.720	20 0.055
21	1 22.077	1 31.906	1 41.736	1 51.565	2 1.395	2 11.225	2 21.054	2 30.884	21 0.057
22	1 22.241	1 32.070	1 41.900	1 51.729	2 1.559	2 11.388	2 21.218	2 31.048	22 0.060
23	1 22.404	1 32.234	1 42.064	1 51.893	2 1.723	2 11.552	2 21.382	2 31.211	23 0.063
24	1 22.568	1 32.398	1 42.227	1 52.057	2 1.887	2 11.716	2 21.546	2 31.375	24 0.066
25	1 22.732	1 32.562	1 42.391	1 52.221	2 2.050	2 11.880	2 21.709	2 31.539	25 0.068
26	1 22.896	1 32.726	1 42.555	1 52.385	2 2.214	2 12.044	2 21.873	2 31.703	26 0.071
27	1 23.060	1 32.889	1 42.719	1 52.548	2 2.378	2 12.208	2 22.037	2 31.867	27 0.074
28	1 23.224	1 33.053	1 42.883	1 52.712	2 2.542	2 12.371	2 22.201	2 32.031	28 0.076
29	1 23.387	1 33.217	1 43.047	1 52.876	2 2.706	2 12.535	2 22.365	2 32.194	29 0.079
30	1 23.551	1 33.381	1 43.210	1 53.040	2 2.869	2 12.699	2 22.529	2 32.358	30 0.082
31	1 23.715	1 33.545	1 43.374	1 53.204	2 3.033	2 12.863	2 22.692	2 32.522	31 0.085
32	1 23.879	1 33.708	1 43.538	1 53.368	2 3.197	2 13.027	2 22.856	2 32.686	32 0.087
33	1 24.043	1 33.872	1 43.702	1 53.531	2 3.361	2 13.191	2 23.020	2 32.850	33 0.090
34	1 24.207	1 34.036	1 43.866	1 53.695	2 3.525	2 13.354	2 23.184	2 33.013	34 0.093
35	1 24.370	1 34.200	1 44.029	1 53.859	2 3.689	2 13.518	2 23.348	2 33.177	35 0.096
36	1 24.534	1 34.364	1 44.193	1 54.023	2 3.852	2 13.682	2 23.512	2 33.341	36 0.098
37	1 24.698	1 34.528	1 44.357	1 54.187	2 4.016	2 13.846	2 23.675	2 33.505	37 0.101
38	1 24.862	1 34.691	1 44.521	1 54.351	2 4.180	2 14.010	2 23.839	2 33.669	38 0.104
39	1 25.026	1 34.855	1 44.685	1 54.514	2 4.344	2 14.173	2 24.003	2 33.833	39 0.106
40	1 25.190	1 35.019	1 44.849	1 54.678	2 4.508	2 14.337	2 24.167	2 33.996	40 0.109
41	1 25.353	1 35.183	1 45.012	1 54.842	2 4.672	2 14.501	2 24.331	2 34.160	41 0.112
42	1 25.517	1 35.347	1 45.176	1 55.006	2 4.835	2 14.665	2 24.495	2 34.324	42 0.115
43	1 25.681	1 35.511	1 45.340	1 55.170	2 4.999	2 14.829	2 24.658	2 34.488	43 0.117
44	1 25.845	1 35.674	1 45.504	1 55.333	2 5.163	2 14.993	2 24.822	2 34.652	44 0.120
45	1 26.009	1 35.838	1 45.668	1 55.497	2 5.327	2 15.156	2 24.986	2 34.816	45 0.123
46	1 26.172	1 36.002	1 45.832	1 55.661	2 5.491	2 15.320	2 25.150	2 34.979	46 0.126
47	1 26.336	1 36.166	1 45.995	1 55.825	2 5.655	2 15.484	2 25.314	2 35.143	47 0.128
48	1 26.500	1 36.330	1 46.159	1 55.989	2 5.818	2 15.648	2 25.477	2 35.307	48 0.131
49	1 26.664	1 36.493	1 46.323	1 56.153	2 5.982	2 15.812	2 25.641	2 35.471	49 0.134
50	1 26.828	1 36.657	1 46.487	1 56.316	2 6.146	2 15.976	2 25.805	2 35.635	50 0.137
51	1 26.992	1 36.821	1 46.651	1 56.480	2 6.310	2 16.139	2 25.969	2 35.798	51 0.139
52	1 27.155	1 36.985	1 46.815	1 56.644	2 6.474	2 16.303	2 26.133	2 35.962	52 0.142
53	1 27.319	1 37.149	1 46.978	1 56.808	2 6.637	2 16.467	2 26.297	2 36.126	53 0.145
54	1 27.483	1 37.313	1 47.142	1 56.972	2 6.801	2 16.631	2 26.460	2 36.290	54 0.147
55	1 27.647	1 37.476	1 47.306	1 57.136	2 6.965	2 16.795	2 26.624	2 36.454	55 0.150
56	1 27.811	1 37.640	1 47.470	1 57.299	2 7.129	2 16.959	2 26.788	2 36.618	56 0.153
57	1 27.975	1 37.804	1 47.634	1 57.463	2 7.293	2 17.122	2 26.952	2 36.781	57 0.156
58	1 28.138	1 37.968	1 47.797	1 57.627	2 7.457	2 17.286	2 27.116	2 36.945	58 0.158
59	1 28.302	1 38.132	1 47.961	1 57.791	2 7.620	2 17.450	2 27.280	2 37.109	59 0.161
Side- real.	8 ^h	9 ^h	10 ^h	11 ^h	12 ^h	13 ^h	14 ^h	15 ^h	For Seconds.

TO BE SUBTRACTED FROM A SIDEREAL TIME INTERVAL.

Side- real.	16 ^h	17 ^h	18 ^h	19 ^h	20 ^h	21 ^h	22 ^h	23 ^h	For Seconds.
m	m s	m s	m s	m s	m s	m s	m s	m s	s s
0	2 37.273	2 47.102	2 56.932	3 6.762	3 16.591	3 26.421	3 36.250	3 46.080	0 0.000
1	2 37.437	2 47.266	2 57.096	3 6.925	3 16.755	3 26.585	3 36.414	3 46.244	1 0.003
2	2 37.601	2 47.430	2 57.260	3 7.089	3 16.919	3 26.748	3 36.578	3 46.407	2 0.005
3	2 37.764	2 47.594	2 57.424	3 7.253	3 17.083	3 26.912	3 36.742	3 46.571	3 0.008
4	2 37.928	2 47.758	2 57.587	3 7.417	3 17.246	3 27.076	3 36.906	3 46.735	4 0.011
5	2 38.092	2 47.922	2 57.751	3 7.581	3 17.410	3 27.240	3 37.069	3 46.899	5 0.014
6	2 38.256	2 48.085	2 57.915	3 7.745	3 17.574	3 27.404	3 37.233	3 47.063	6 0.016
7	2 38.420	2 48.249	2 58.079	3 7.908	3 17.738	3 27.568	3 37.397	3 47.227	7 0.019
8	2 38.584	2 48.413	2 58.243	3 8.072	3 17.902	3 27.731	3 37.561	3 47.390	8 0.022
9	2 38.747	2 48.577	2 58.406	3 8.236	3 18.066	3 27.895	3 37.725	3 47.554	9 0.025
10	2 38.911	2 48.741	2 58.570	3 8.400	3 18.229	3 28.059	3 37.889	3 47.718	10 0.027
11	2 39.075	2 48.905	2 58.734	3 8.564	3 18.393	3 28.223	3 38.052	3 47.882	11 0.030
12	2 39.239	2 49.068	2 58.898	3 8.728	3 18.557	3 28.387	3 38.216	3 48.046	12 0.033
13	2 39.403	2 49.232	2 59.062	3 8.891	3 18.721	3 28.550	3 38.380	3 48.210	13 0.035
14	2 39.566	2 49.396	2 59.226	3 9.055	3 18.885	3 28.714	3 38.544	3 48.373	14 0.038
15	2 39.730	2 49.560	2 59.389	3 9.219	3 19.049	3 28.878	3 38.708	3 48.537	15 0.041
16	2 39.894	2 49.724	2 59.553	3 9.383	3 19.212	3 29.042	3 38.871	3 48.701	16 0.044
17	2 40.058	2 49.888	2 59.717	3 9.547	3 19.376	3 29.206	3 39.035	3 48.865	17 0.046
18	2 40.222	2 50.051	2 59.881	3 9.710	3 19.540	3 29.370	3 39.199	3 49.029	18 0.049
19	2 40.386	2 50.215	3 0.045	3 9.874	3 19.704	3 29.533	3 39.363	3 49.193	19 0.052
20	2 40.549	2 50.379	3 0.209	3 10.038	3 19.868	3 29.697	3 39.527	3 49.356	20 0.055
21	2 40.713	2 50.543	3 0.372	3 10.202	3 20.032	3 29.861	3 39.691	3 49.520	21 0.057
22	2 40.877	2 50.707	3 0.536	3 10.366	3 20.195	3 30.025	3 39.854	3 49.684	22 0.060
23	2 41.041	2 50.870	3 0.700	3 10.530	3 20.359	3 30.189	3 40.018	3 49.848	23 0.063
24	2 41.205	2 51.034	3 0.864	3 10.693	3 20.523	3 30.353	3 40.182	3 50.012	24 0.066
25	2 41.369	2 51.198	3 1.028	3 10.857	3 20.687	3 30.516	3 40.346	3 50.175	25 0.068
26	2 41.532	2 51.362	3 1.192	3 11.021	3 20.851	3 30.680	3 40.510	3 50.339	26 0.071
27	2 41.696	2 51.526	3 1.355	3 11.185	3 21.014	3 30.844	3 40.674	3 50.503	27 0.074
28	2 41.860	2 51.690	3 1.519	3 11.349	3 21.178	3 31.008	3 40.837	3 50.667	28 0.076
29	2 42.024	2 51.853	3 1.683	3 11.513	3 21.342	3 31.172	3 41.001	3 50.831	29 0.079
30	2 42.188	2 52.017	3 1.847	3 11.676	3 21.506	3 31.336	3 41.165	3 50.995	30 0.082
31	2 42.352	2 52.181	3 2.011	3 11.840	3 21.670	3 31.499	3 41.329	3 51.158	31 0.085
32	2 42.515	2 52.345	3 2.174	3 12.004	3 21.834	3 31.663	3 41.493	3 51.322	32 0.087
33	2 42.679	2 52.509	3 2.338	3 12.168	3 21.997	3 31.827	3 41.657	3 51.486	33 0.090
34	2 42.843	2 52.673	3 2.502	3 12.332	3 22.161	3 31.991	3 41.820	3 51.650	34 0.093
35	2 43.007	2 52.836	3 2.666	3 12.496	3 22.325	3 32.155	3 41.984	3 51.814	35 0.096
36	2 43.171	2 53.000	3 2.830	3 12.659	3 22.489	3 32.318	3 42.148	3 51.978	36 0.098
37	2 43.334	2 53.164	3 2.994	3 12.823	3 22.653	3 32.482	3 42.312	3 52.141	37 0.101
38	2 43.498	2 53.328	3 3.157	3 12.987	3 22.817	3 32.646	3 42.476	3 52.305	38 0.104
39	2 43.662	2 53.492	3 3.321	3 13.151	3 22.980	3 32.810	3 42.639	3 52.469	39 0.106
40	2 43.826	2 53.656	3 3.485	3 13.315	3 23.144	3 32.974	3 42.803	3 52.633	40 0.109
41	2 43.990	2 53.819	3 3.649	3 13.478	3 23.308	3 33.138	3 42.967	3 52.797	41 0.112
42	2 44.154	2 53.983	3 3.813	3 13.642	3 23.472	3 33.301	3 43.131	3 52.961	42 0.115
43	2 44.317	2 54.147	3 3.977	3 13.806	3 23.636	3 33.465	3 43.295	3 53.124	43 0.117
44	2 44.481	2 54.311	3 4.140	3 13.970	3 23.800	3 33.629	3 43.459	3 53.288	44 0.120
45	2 44.645	2 54.475	3 4.304	3 14.134	3 23.963	3 33.793	3 43.622	3 53.452	45 0.123
46	2 44.809	2 54.638	3 4.468	3 14.298	3 24.127	3 33.957	3 43.786	3 53.616	46 0.126
47	2 44.973	2 54.802	3 4.632	3 14.461	3 24.291	3 34.121	3 43.950	3 53.780	47 0.128
48	2 45.137	2 54.966	3 4.796	3 14.625	3 24.455	3 34.284	3 44.114	3 53.943	48 0.131
49	2 45.300	2 55.130	3 4.960	3 14.789	3 24.619	3 34.448	3 44.278	3 54.107	49 0.134
50	2 45.464	2 55.294	3 5.123	3 14.953	3 24.782	3 34.612	3 44.442	3 54.271	50 0.137
51	2 45.628	2 55.458	3 5.287	3 15.117	3 24.946	3 34.776	3 44.605	3 54.435	51 0.139
52	2 45.792	2 55.621	3 5.451	3 15.281	3 25.110	3 34.940	3 44.769	3 54.599	52 0.142
53	2 45.956	2 55.785	3 5.615	3 15.444	3 25.274	3 35.104	3 44.933	3 54.763	53 0.145
54	2 46.120	2 55.949	3 5.779	3 15.608	3 25.438	3 35.267	3 45.097	3 54.926	54 0.147
55	2 46.283	2 56.113	3 5.942	3 15.772	3 25.602	3 35.431	3 45.261	3 55.090	55 0.150
56	2 46.447	2 56.277	3 6.106	3 15.936	3 25.765	3 35.595	3 45.425	3 55.254	56 0.153
57	2 46.611	2 56.441	3 6.270	3 16.100	3 25.929	3 35.759	3 45.588	3 55.418	57 0.156
58	2 46.775	2 56.604	3 6.434	3 16.264	3 26.093	3 35.923	3 45.752	3 55.582	58 0.158
59	2 46.939	2 56.768	3 6.598	3 16.427	3 26.257	3 36.086	3 45.916	3 55.746	59 0.161

Side-
real.16^h17^h18^h19^h20^h21^h22^h23^hFor
Seconds.

[Rph 13]

TO BE ADDED TO A MEAN TIME INTERVAL.

Mean Solar.	O ^h	I ^h	2 ^h	3 ^h	4 ^h	5 ^h	6 ^h	7 ^h	For Seconds.
m	m s	m s	m s	m s	m s	m s	m s	m s	s s
0	0 0.000	0 9.856	0 19.713	0 29.569	0 39.426	0 49.282	0 59.139	1 8.995	0 0.000
1	0 0.104	0 10.021	0 19.877	0 29.734	0 39.590	0 49.447	0 59.303	1 9.160	1 0.003
2	0 0.329	0 10.185	0 20.041	0 29.898	0 39.754	0 49.611	0 59.467	1 9.324	2 0.005
3	0 0.493	0 10.349	0 20.206	0 30.062	0 39.919	0 49.775	0 59.632	1 9.488	3 0.008
4	0 0.657	0 10.514	0 20.370	0 30.227	0 40.083	0 49.939	0 59.796	1 9.652	4 0.011
5	0 0.821	0 10.678	0 20.534	0 30.391	0 40.247	0 50.104	0 59.960	1 9.817	5 0.014
6	0 0.986	0 10.842	0 20.699	0 30.555	0 40.412	0 50.268	1 0.124	1 9.981	6 0.016
7	0 1.150	0 11.006	0 20.863	0 30.719	0 40.576	0 50.432	1 0.289	1 10.145	7 0.019
8	0 1.314	0 11.171	0 21.027	0 30.884	0 40.740	0 50.597	1 0.453	1 10.310	8 0.022
9	0 1.478	0 11.335	0 21.191	0 31.048	0 40.904	0 50.761	1 0.617	1 10.474	9 0.025
10	0 1.643	0 11.499	0 21.356	0 31.212	0 41.069	0 50.925	1 0.782	1 10.638	10 0.027
11	0 1.807	0 11.663	0 21.520	0 31.376	0 41.233	0 51.089	1 0.946	1 10.802	11 0.030
12	0 1.971	0 11.828	0 21.684	0 31.541	0 41.397	0 51.254	1 1.110	1 10.967	12 0.033
13	0 2.136	0 11.992	0 21.849	0 31.705	0 41.561	0 51.418	1 1.274	1 11.131	13 0.036
14	0 2.300	0 12.156	0 22.013	0 31.869	0 41.726	0 51.582	1 1.439	1 11.295	14 0.038
15	0 2.464	0 12.321	0 22.177	0 32.034	0 41.890	0 51.746	1 1.603	1 11.459	15 0.041
16	0 2.628	0 12.485	0 22.341	0 32.198	0 42.054	0 51.911	1 1.767	1 11.624	16 0.044
17	0 2.793	0 12.649	0 22.506	0 32.362	0 42.219	0 52.075	1 1.932	1 11.788	17 0.047
18	0 2.957	0 12.813	0 22.670	0 32.526	0 42.383	0 52.239	1 2.096	1 11.952	18 0.049
19	0 3.121	0 12.978	0 22.834	0 32.691	0 42.547	0 52.404	1 2.260	1 12.117	19 0.052
20	0 3.285	0 13.142	0 22.998	0 32.855	0 42.711	0 52.568	1 2.424	1 12.281	20 0.055
21	0 3.450	0 13.306	0 23.163	0 33.019	0 42.876	0 52.732	1 2.589	1 12.445	21 0.057
22	0 3.614	0 13.471	0 23.327	0 33.183	0 43.040	0 52.896	1 2.753	1 12.609	22 0.060
23	0 3.778	0 13.635	0 23.491	0 33.348	0 43.204	0 53.061	1 2.917	1 12.774	23 0.063
24	0 3.943	0 13.799	0 23.656	0 33.512	0 43.368	0 53.225	1 3.081	1 12.938	24 0.066
25	0 4.107	0 13.963	0 23.820	0 33.676	0 43.533	0 53.389	1 3.246	1 13.102	25 0.068
26	0 4.271	0 14.128	0 23.984	0 33.841	0 43.697	0 53.554	1 3.410	1 13.266	26 0.071
27	0 4.435	0 14.292	0 24.148	0 34.005	0 43.861	0 53.718	1 3.574	1 13.431	27 0.074
28	0 4.600	0 14.456	0 24.313	0 34.169	0 44.026	0 53.882	1 3.739	1 13.595	28 0.077
29	0 4.764	0 14.620	0 24.477	0 34.333	0 44.190	0 54.046	1 3.903	1 13.759	29 0.079
30	0 4.928	0 14.785	0 24.641	0 34.498	0 44.354	0 54.211	1 4.067	1 13.924	30 0.082
31	0 5.093	0 14.949	0 24.805	0 34.662	0 44.518	0 54.375	1 4.231	1 14.088	31 0.085
32	0 5.257	0 15.113	0 24.970	0 34.826	0 44.683	0 54.539	1 4.396	1 14.252	32 0.088
33	0 5.421	0 15.278	0 25.134	0 34.990	0 44.847	0 54.703	1 4.560	1 14.416	33 0.090
34	0 5.585	0 15.442	0 25.298	0 35.155	0 45.011	0 54.868	1 4.724	1 14.581	34 0.093
35	0 5.750	0 15.606	0 25.463	0 35.319	0 45.176	0 55.032	1 4.888	1 14.745	35 0.096
36	0 5.914	0 15.770	0 25.627	0 35.483	0 45.340	0 55.196	1 5.053	1 14.909	36 0.099
37	0 6.078	0 15.935	0 25.791	0 35.648	0 45.504	0 55.361	1 5.217	1 15.073	37 0.101
38	0 6.242	0 16.099	0 25.955	0 35.812	0 45.668	0 55.525	1 5.381	1 15.238	38 0.104
39	0 6.407	0 16.263	0 26.120	0 35.976	0 45.833	0 55.689	1 5.546	1 15.402	39 0.107
40	0 6.571	0 16.427	0 26.284	0 36.140	0 45.997	0 55.853	1 5.710	1 15.566	40 0.110
41	0 6.735	0 16.592	0 26.448	0 36.305	0 46.161	0 56.018	1 5.874	1 15.731	41 0.112
42	0 6.900	0 16.756	0 26.612	0 36.469	0 46.325	0 56.182	1 6.038	1 15.895	42 0.115
43	0 7.064	0 16.920	0 26.777	0 36.633	0 46.490	0 56.346	1 6.203	1 16.059	43 0.118
44	0 7.228	0 17.085	0 26.941	0 36.798	0 46.654	0 56.510	1 6.367	1 16.223	44 0.120
45	0 7.392	0 17.249	0 27.105	0 36.962	0 46.818	0 56.675	1 6.531	1 16.388	45 0.123
46	0 7.557	0 17.413	0 27.270	0 37.126	0 46.983	0 56.839	1 6.695	1 16.552	46 0.126
47	0 7.721	0 17.577	0 27.434	0 37.290	0 47.147	0 57.003	1 6.860	1 16.716	47 0.129
48	0 7.885	0 17.742	0 27.598	0 37.455	0 47.311	0 57.168	1 7.024	1 16.881	48 0.131
49	0 8.049	0 17.906	0 27.762	0 37.619	0 47.475	0 57.332	1 7.188	1 17.045	49 0.134
50	0 8.214	0 18.070	0 27.927	0 37.783	0 47.640	0 57.496	1 7.353	1 17.209	50 0.137
51	0 8.378	0 18.234	0 28.091	0 37.947	0 47.804	0 57.660	1 7.517	1 17.373	51 0.140
52	0 8.542	0 18.399	0 28.255	0 38.112	0 47.968	0 57.825	1 7.681	1 17.538	52 0.142
53	0 8.707	0 18.563	0 28.420	0 38.276	0 48.132	0 57.989	1 7.845	1 17.702	53 0.145
54	0 8.871	0 18.727	0 28.584	0 38.440	0 48.297	0 58.153	1 8.010	1 17.866	54 0.148
55	0 9.035	0 18.892	0 28.748	0 38.605	0 48.461	0 58.317	1 8.174	1 18.030	55 0.151
56	0 9.199	0 19.056	0 28.912	0 38.769	0 48.625	0 58.482	1 8.338	1 18.195	56 0.153
57	0 9.364	0 19.220	0 29.077	0 38.933	0 48.790	0 58.646	1 8.502	1 18.359	57 0.156
58	0 9.528	0 19.384	0 29.241	0 39.097	0 48.954	0 58.810	1 8.667	1 18.523	58 0.159
59	0 9.692	0 19.549	0 29.405	0 39.262	0 49.118	0 58.975	1 8.831	1 18.688	59 0.162
Mean Solar.	O ^h	I ^h	2 ^h	3 ^h	4 ^h	5 ^h	6 ^h	7 ^h	For Seconds.

TO BE ADDED TO A MEAN TIME INTERVAL.

Mean Solar.	8 ^h	9 ^h	10 ^h	11 ^h	12 ^h	13 ^h	14 ^h	15 ^h	For Seconds.
m	m s	m s	m s	m s	m s	m s	m s	m s	s s
0	1 18.852	1 28.708	1 38.565	1 48.421	1 58.278	2 8.134	2 17.991	2 27.847	0 0.000
1	1 19.016	1 28.873	1 38.729	1 48.585	1 58.442	2 8.298	2 18.155	2 28.011	1 0.003
2	1 19.180	1 29.037	1 38.893	1 48.750	1 58.606	2 8.463	2 18.319	2 28.176	2 0.005
3	1 19.345	1 29.201	1 39.058	1 48.914	1 58.771	2 8.627	2 18.483	2 28.340	3 0.008
4	1 19.509	1 29.365	1 39.222	1 49.078	1 58.935	2 8.791	2 18.648	2 28.504	4 0.011
5	1 19.673	1 29.530	1 39.386	1 49.243	1 59.099	2 8.956	2 18.812	2 28.668	5 0.014
6	1 19.837	1 29.694	1 39.550	1 49.407	1 59.263	2 9.120	2 18.976	2 28.833	6 0.016
7	1 20.002	1 29.858	1 39.715	1 49.571	1 59.428	2 9.284	2 19.141	2 28.997	7 0.019
8	1 20.166	1 30.022	1 39.879	1 49.735	1 59.592	2 9.448	2 19.305	2 29.161	8 0.022
9	1 20.330	1 30.187	1 40.043	1 49.900	1 59.756	2 9.613	2 19.469	2 29.326	9 0.025
10	1 20.495	1 30.351	1 40.207	1 50.064	1 59.920	2 9.777	2 19.633	2 29.490	10 0.027
11	1 20.659	1 30.515	1 40.372	1 50.228	2 0.085	2 9.941	2 19.798	2 29.654	11 0.030
12	1 20.823	1 30.680	1 40.536	1 50.393	2 0.249	2 10.105	2 19.962	2 29.818	12 0.033
13	1 20.987	1 30.844	1 40.700	1 50.557	2 0.413	2 10.270	2 20.126	2 29.983	13 0.036
14	1 21.152	1 31.008	1 40.865	1 50.721	2 0.578	2 10.434	2 20.290	2 30.147	14 0.038
15	1 21.316	1 31.172	1 41.029	1 50.885	2 0.742	2 10.598	2 20.455	2 30.311	15 0.041
16	1 21.480	1 31.337	1 41.193	1 51.050	2 0.906	2 10.763	2 20.619	2 30.476	16 0.044
17	1 21.644	1 31.501	1 41.357	1 51.214	2 1.070	2 10.927	2 20.783	2 30.640	17 0.047
18	1 21.809	1 31.665	1 41.522	1 51.378	2 1.235	2 11.091	2 20.948	2 30.804	18 0.049
19	1 21.973	1 31.829	1 41.686	1 51.542	2 1.399	2 11.255	2 21.112	2 30.968	19 0.052
20	1 22.137	1 31.994	1 41.850	1 51.707	2 1.563	2 11.420	2 21.276	2 31.133	20 0.055
21	1 22.302	1 32.158	1 42.015	1 51.871	2 1.727	2 11.584	2 21.440	2 31.297	21 0.057
22	1 22.466	1 32.322	1 42.179	1 52.035	2 1.892	2 11.748	2 21.605	2 31.461	22 0.060
23	1 22.630	1 32.487	1 42.343	1 52.200	2 2.056	2 11.912	2 21.769	2 31.625	23 0.063
24	1 22.794	1 32.651	1 42.507	1 52.364	2 2.220	2 12.077	2 21.933	2 31.790	24 0.066
25	1 22.959	1 32.815	1 42.672	1 52.528	2 2.385	2 12.241	2 22.098	2 31.954	25 0.068
26	1 23.123	1 32.979	1 42.836	1 52.692	2 2.549	2 12.405	2 22.262	2 32.118	26 0.071
27	1 23.287	1 33.144	1 43.000	1 52.857	2 2.713	2 12.570	2 22.426	2 32.283	27 0.074
28	1 23.451	1 33.308	1 43.164	1 53.021	2 2.877	2 12.734	2 22.590	2 32.447	28 0.077
29	1 23.616	1 33.472	1 43.329	1 53.185	2 3.042	2 12.898	2 22.755	2 32.611	29 0.079
30	1 23.780	1 33.637	1 43.493	1 53.349	2 3.206	2 13.062	2 22.919	2 32.775	30 0.082
31	1 23.944	1 33.801	1 43.657	1 53.514	2 3.370	2 13.227	2 23.083	2 32.940	31 0.085
32	1 24.109	1 33.965	1 43.822	1 53.678	2 3.534	2 13.391	2 23.247	2 33.104	32 0.088
33	1 24.273	1 34.129	1 43.986	1 53.842	2 3.699	2 13.555	2 23.412	2 33.268	33 0.090
34	1 24.437	1 34.294	1 44.150	1 54.007	2 3.863	2 13.720	2 23.576	2 33.432	34 0.093
35	1 24.601	1 34.458	1 44.314	1 54.171	2 4.027	2 13.884	2 23.740	2 33.597	35 0.096
36	1 24.766	1 34.622	1 44.479	1 54.335	2 4.192	2 14.048	2 23.905	2 33.761	36 0.099
37	1 24.930	1 34.786	1 44.643	1 54.499	2 4.356	2 14.212	2 24.069	2 33.925	37 0.101
38	1 25.094	1 34.951	1 44.807	1 54.664	2 4.520	2 14.377	2 24.233	2 34.090	38 0.104
39	1 25.259	1 35.115	1 44.971	1 54.828	2 4.684	2 14.541	2 24.397	2 34.254	39 0.107
40	1 25.423	1 35.279	1 45.136	1 54.992	2 4.849	2 14.705	2 24.562	2 34.418	40 0.110
41	1 25.587	1 35.444	1 45.300	1 55.156	2 5.013	2 14.869	2 24.726	2 34.582	41 0.113
42	1 25.751	1 35.608	1 45.464	1 55.321	2 5.177	2 15.034	2 24.890	2 34.747	42 0.115
43	1 25.916	1 35.772	1 45.629	1 55.485	2 5.342	2 15.198	2 25.054	2 34.911	43 0.118
44	1 26.080	1 35.936	1 45.793	1 55.649	2 5.506	2 15.362	2 25.219	2 35.075	44 0.120
45	1 26.244	1 36.101	1 45.957	1 55.814	2 5.670	2 15.527	2 25.383	2 35.239	45 0.123
46	1 26.408	1 36.265	1 46.121	1 55.978	2 5.834	2 15.691	2 25.547	2 35.404	46 0.126
47	1 26.573	1 36.429	1 46.286	1 56.142	2 5.999	2 15.855	2 25.712	2 35.568	47 0.129
48	1 26.737	1 36.593	1 46.450	1 56.306	2 6.163	2 16.019	2 25.876	2 35.732	48 0.131
49	1 26.901	1 36.758	1 46.614	1 56.471	2 6.327	2 16.184	2 26.040	2 35.897	49 0.134
50	1 27.066	1 36.922	1 46.778	1 56.635	2 6.491	2 16.348	2 26.204	2 36.061	50 0.137
51	1 27.230	1 37.086	1 46.943	1 56.799	2 6.656	2 16.512	2 26.369	2 36.225	51 0.140
52	1 27.394	1 37.251	1 47.107	1 56.964	2 6.820	2 16.676	2 26.533	2 36.389	52 0.143
53	1 27.558	1 37.415	1 47.271	1 57.128	2 6.984	2 16.841	2 26.697	2 36.554	53 0.145
54	1 27.723	1 37.579	1 47.436	1 57.292	2 7.149	2 17.005	2 26.861	2 36.718	54 0.148
55	1 27.887	1 37.743	1 47.600	1 57.456	2 7.313	2 17.169	2 27.026	2 36.882	55 0.151
56	1 28.051	1 37.908	1 47.764	1 57.621	2 7.477	2 17.334	2 27.190	2 37.047	56 0.153
57	1 28.215	1 38.072	1 47.928	1 57.785	2 7.641	2 17.498	2 27.354	2 37.211	57 0.156
58	1 28.380	1 38.236	1 48.093	1 57.949	2 7.806	2 17.662	2 27.519	2 37.375	58 0.159
59	1 28.544	1 38.400	1 48.257	1 58.113	2 7.970	2 17.826	2 27.683	2 37.539	59 0.162

Mean Solar.	8 ^h	9 ^h	10 ^h	11 ^h	12 ^h	13 ^h	14 ^h	15 ^h	For Seconds.
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[Eph 15]

TO BE ADDED TO A MEAN TIME INTERVAL.

Mean Solar.	16 ^h	17 ^h	18 ^h	19 ^h	20 ^h	21 ^h	22 ^h	23 ^h	For Seconds.
m	m s	m s	m s	m s	m s	m s	m s	m s	s s
0	2 37.704	2 47.560	2 57.417	3 7.273	3 17.129	3 26.986	3 36.842	3 46.699	0 0.000
1	2 37.868	2 47.724	2 57.581	3 7.437	3 17.294	3 27.150	3 37.007	3 46.863	1 0.003
2	2 38.032	2 47.889	2 57.745	3 7.602	3 17.458	3 27.315	3 37.171	3 47.027	2 0.005
3	2 38.196	2 48.053	2 57.909	3 7.766	3 17.622	3 27.479	3 37.335	3 47.192	3 0.008
4	2 38.361	2 48.217	2 58.074	3 7.930	3 17.787	3 27.643	3 37.500	3 47.356	4 0.011
5	2 38.525	2 48.381	2 58.238	3 8.094	3 17.951	3 27.807	3 37.664	3 47.520	5 0.014
6	2 38.689	2 48.546	2 58.402	3 8.259	3 18.115	3 27.972	3 37.828	3 47.685	6 0.016
7	2 38.854	2 48.710	2 58.566	3 8.423	3 18.279	3 28.136	3 37.992	3 47.849	7 0.019
8	2 39.018	2 48.874	2 58.731	3 8.587	3 18.444	3 28.300	3 38.157	3 48.013	8 0.022
9	2 39.182	2 49.039	2 58.895	3 8.751	3 18.608	3 28.464	3 38.321	3 48.177	9 0.025
10	2 39.346	2 49.203	2 59.059	3 8.916	3 18.772	3 28.629	3 38.485	3 48.342	10 0.027
11	2 39.511	2 49.367	2 59.224	3 9.080	3 18.937	3 28.793	3 38.649	3 48.506	11 0.030
12	2 39.675	2 49.531	2 59.388	3 9.244	3 19.101	3 28.957	3 38.814	3 48.670	12 0.033
13	2 39.839	2 49.696	2 59.552	3 9.409	3 19.265	3 29.122	3 38.978	3 48.834	13 0.036
14	2 40.003	2 49.860	2 59.716	3 9.573	3 19.429	3 29.286	3 39.142	3 48.999	14 0.038
15	2 40.168	2 50.024	2 59.881	3 9.737	3 19.594	3 29.450	3 39.307	3 49.163	15 0.041
16	2 40.332	2 50.188	3 0.045	3 9.901	3 19.758	3 29.614	3 39.471	3 49.327	16 0.044
17	2 40.496	2 50.353	3 0.209	3 10.066	3 19.922	3 29.779	3 39.635	3 49.492	17 0.047
18	2 40.661	2 50.517	3 0.373	3 10.230	3 20.086	3 29.943	3 39.799	3 49.656	18 0.049
19	2 40.825	2 50.681	3 0.538	3 10.394	3 20.251	3 30.107	3 39.964	3 49.820	19 0.052
20	2 40.989	2 50.846	3 0.702	3 10.559	3 20.415	3 30.271	3 40.128	3 49.984	20 0.055
21	2 41.153	2 51.010	3 0.866	3 10.723	3 20.579	3 30.436	3 40.292	3 50.149	21 0.057
22	2 41.318	2 51.174	3 1.031	3 10.887	3 20.744	3 30.600	3 40.456	3 50.313	22 0.060
23	2 41.482	2 51.338	3 1.195	3 11.051	3 20.908	3 30.764	3 40.621	3 50.477	23 0.063
24	2 41.646	2 51.503	3 1.359	3 11.216	3 21.072	3 30.929	3 40.785	3 50.642	24 0.066
25	2 41.810	2 51.667	3 1.523	3 11.380	3 21.236	3 31.093	3 40.949	3 50.806	25 0.068
26	2 41.975	2 51.831	3 1.688	3 11.544	3 21.401	3 31.257	3 41.114	3 50.970	26 0.071
27	2 42.139	2 51.995	3 1.852	3 11.708	3 21.565	3 31.421	3 41.278	3 51.134	27 0.074
28	2 42.303	2 52.160	3 2.016	3 11.873	3 21.729	3 31.586	3 41.442	3 51.299	28 0.077
29	2 42.468	2 52.324	3 2.181	3 12.037	3 21.893	3 31.750	3 41.606	3 51.463	29 0.079
30	2 42.632	2 52.488	3 2.345	3 12.201	3 22.058	3 31.914	3 41.771	3 51.627	30 0.082
31	2 42.796	2 52.653	3 2.509	3 12.366	3 22.222	3 32.078	3 41.935	3 51.791	31 0.085
32	2 42.960	2 52.817	3 2.673	3 12.530	3 22.386	3 32.243	3 42.099	3 51.956	32 0.088
33	2 43.125	2 52.981	3 2.838	3 12.694	3 22.551	3 32.407	3 42.264	3 52.120	33 0.090
34	2 43.289	2 53.145	3 3.002	3 12.858	3 22.715	3 32.571	3 42.428	3 52.284	34 0.093
35	2 43.453	2 53.310	3 3.166	3 13.023	3 22.879	3 32.736	3 42.592	3 52.449	35 0.096
36	2 43.617	2 53.474	3 3.330	3 13.187	3 23.043	3 32.900	3 42.756	3 52.613	36 0.099
37	2 43.782	2 53.638	3 3.495	3 13.351	3 23.208	3 33.064	3 42.921	3 52.777	37 0.101
38	2 43.946	2 53.803	3 3.659	3 13.515	3 23.372	3 33.228	3 43.085	3 52.941	38 0.104
39	2 44.110	2 53.967	3 3.823	3 13.680	3 23.536	3 33.393	3 43.249	3 53.106	39 0.107
40	2 44.275	2 54.131	3 3.988	3 13.844	3 23.700	3 33.557	3 43.413	3 53.270	40 0.110
41	2 44.439	2 54.295	3 4.152	3 14.008	3 23.865	3 33.721	3 43.578	3 53.434	41 0.112
42	2 44.603	2 54.460	3 4.316	3 14.173	3 24.029	3 33.886	3 43.742	3 53.598	42 0.115
43	2 44.767	2 54.624	3 4.480	3 14.337	3 24.193	3 34.050	3 43.906	3 53.763	43 0.118
44	2 44.932	2 54.788	3 4.645	3 14.501	3 24.358	3 34.214	3 44.071	3 53.927	44 0.120
45	2 45.096	2 54.952	3 4.809	3 14.665	3 24.522	3 34.378	3 44.235	3 54.091	45 0.123
46	2 45.260	2 55.117	3 4.973	3 14.830	3 24.686	3 34.543	3 44.399	3 54.256	46 0.126
47	2 45.425	2 55.281	3 5.137	3 14.994	3 24.850	3 34.707	3 44.563	3 54.420	47 0.129
48	2 45.589	2 55.445	3 5.302	3 15.158	3 25.015	3 34.871	3 44.728	3 54.584	48 0.131
49	2 45.753	2 55.610	3 5.466	3 15.322	3 25.179	3 35.035	3 44.892	3 54.748	49 0.134
50	2 45.917	2 55.774	3 5.630	3 15.487	3 25.343	3 35.200	3 45.056	3 54.913	50 0.137
51	2 46.082	2 55.938	3 5.795	3 15.651	3 25.508	3 35.364	3 45.220	3 55.077	51 0.140
52	2 46.246	2 56.102	3 5.959	3 15.815	3 25.672	3 35.528	3 45.385	3 55.241	52 0.142
53	2 46.410	2 56.267	3 6.123	3 15.980	3 25.836	3 35.693	3 45.549	3 55.405	53 0.145
54	2 46.574	2 56.431	3 6.287	3 16.144	3 26.000	3 35.857	3 45.713	3 55.570	54 0.148
55	2 46.739	2 56.595	3 6.452	3 16.308	3 26.165	3 36.021	3 45.878	3 55.734	55 0.151
56	2 46.903	2 56.759	3 6.616	3 16.472	3 26.329	3 36.185	3 46.042	3 55.898	56 0.153
57	2 47.067	2 56.924	3 6.780	3 16.637	3 26.493	3 36.350	3 46.206	3 56.063	57 0.156
58	2 47.232	2 57.088	3 6.944	3 16.801	3 26.657	3 36.514	3 46.370	3 56.227	58 0.159
59	2 47.396	2 57.252	3 7.109	3 16.965	3 26.822	3 36.678	3 46.535	3 56.391	59 0.162
Mean Solar.	16 ^h	17 ^h	18 ^h	19 ^h	20 ^h	21 ^h	22 ^h	23 ^h	For Seconds.

[Eph 15]

AZIMUTH OF POLARIS AT ALL HOUR ANGLES. 1915.

[For hour angles 0^h to 12^h the star is west of north, and for hour angles 12^h to 24^h it is east of north.]

H.A.	Lat.	10°	15°	20°	25°	30°	35°	40°	45°	50°	Lat.	H.A.
h m	°	°	°	°	°	°	°	°	°	°	°	h m
0 0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	24 0
12	0 3.7	0 3.7	0 3.8	0 4.0	0 4.2	0 4.4	0 4.8	0 5.2	0 5.7	0 5.7	23 48	
24	0 7.3	0 7.5	0 7.7	0 8.0	0 8.4	0 8.9	0 9.5	0 10.3	0 11.4	0 11.4	36	
36	0 10.9	0 11.2	0 11.5	0 12.0	0 12.5	0 13.3	0 14.2	0 15.5	0 17.1	0 17.1	24	
48	0 14.5	0 14.8	0 15.3	0 15.9	0 16.6	0 17.6	0 18.9	0 20.6	0 22.7	0 22.7	12	
1 0	0 18.1	0 18.5	0 19.0	0 19.8	0 20.7	0 22.0	0 23.5	0 25.6	0 28.2	0 28.2	23 0	
12	0 21.6	0 22.0	0 22.7	0 23.6	0 24.8	0 26.2	0 28.1	0 30.6	0 33.7	0 33.7	22 48	
24	0 25.0	0 25.6	0 26.3	0 27.3	0 28.7	0 30.4	0 32.6	0 35.4	0 39.1	0 39.1	36	
36	0 28.4	0 29.0	0 29.9	0 31.0	0 32.6	0 34.5	0 37.0	0 40.2	0 44.3	0 44.3	24	
48	0 31.7	0 32.4	0 33.4	0 34.6	0 36.3	0 38.5	0 41.2	0 44.8	0 49.4	0 49.4	12	
2 0	0 34.9	0 35.7	0 36.7	0 38.1	0 40.0	0 42.4	0 45.4	0 49.3	0 54.4	0 54.4	22 0	
12	0 38.0	0 38.8	0 40.0	0 41.5	0 43.6	0 46.1	0 49.4	0 53.7	0 59.3	0 59.3	21 48	
24	0 41.0	0 41.9	0 43.2	0 44.8	0 47.0	0 49.8	0 53.3	0 57.9	1 3.9	1 3.9	36	
36	0 43.9	0 44.9	0 46.2	0 48.0	0 50.3	0 53.3	0 57.1	1 2.0	1 8.4	1 8.4	24	
48	0 46.7	0 47.7	0 49.1	0 51.0	0 53.4	0 56.6	1 0.6	1 5.9	1 12.7	1 12.7	12	
3 0	0 49.4	0 50.4	0 51.9	0 53.9	0 56.5	0 59.8	1 4.1	1 9.6	1 16.7	1 16.7	21 0	
12	0 51.9	0 53.0	0 54.5	0 56.6	0 59.3	1 2.8	1 7.3	1 13.0	1 20.6	1 20.6	20 48	
24	0 54.2	0 55.4	0 57.0	0 59.2	1 2.0	1 5.6	1 10.3	1 16.3	1 24.2	1 24.2	36	
36	0 56.5	0 57.6	0 59.3	1 1.6	1 4.5	1 8.3	1 13.1	1 19.4	1 27.5	1 27.5	24	
48	0 58.5	0 59.7	1 1.5	1 3.8	1 6.8	1 10.8	1 15.8	1 22.2	1 30.6	1 30.6	12	
4 0	1 0.4	1 1.7	1 3.4	1 5.8	1 9.0	1 13.0	1 18.2	1 24.8	1 33.5	1 33.5	20 0	
12	1 2.2	1 3.4	1 5.2	1 7.7	1 10.9	1 15.1	1 20.4	1 27.2	1 36.1	1 36.1	19 48	
24	1 3.7	1 5.0	1 6.9	1 9.4	1 12.7	1 16.9	1 22.3	1 29.3	1 38.4	1 38.4	36	
36	1 5.1	1 6.4	1 8.3	1 10.9	1 14.2	1 18.6	1 24.1	1 31.2	1 40.5	1 40.5	24	
48	1 6.3	1 7.6	1 9.6	1 12.2	1 15.6	1 20.0	1 25.6	1 32.8	1 42.2	1 42.2	12	
5 0	1 7.3	1 8.7	1 10.6	1 13.3	1 16.7	1 21.2	1 26.9	1 34.2	1 43.7	1 43.7	19 0	
12	1 8.2	1 9.5	1 11.5	1 14.2	1 17.6	1 22.1	1 27.9	1 35.3	1 44.9	1 44.9	18 48	
24	1 8.8	1 10.2	1 12.2	1 14.8	1 18.4	1 22.9	1 28.7	1 36.1	1 45.8	1 45.8	36	
36	1 9.3	1 10.7	1 12.6	1 15.3	1 18.9	1 23.4	1 29.2	1 36.7	1 46.4	1 46.4	24	
48	1 9.6	1 10.9	1 12.9	1 15.6	1 19.1	1 23.7	1 29.5	1 37.0	1 46.7	1 46.7	12	
6 0	1 9.6	1 11.0	1 13.0	1 15.7	1 19.2	1 23.7	1 29.5	1 37.0	1 46.7	1 46.7	18 0	
12	1 9.5	1 10.9	1 12.8	1 15.5	1 19.0	1 23.6	1 29.3	1 36.8	1 46.4	1 46.4	17 48	
24	1 9.2	1 10.6	1 12.5	1 15.2	1 18.7	1 23.1	1 28.9	1 36.3	1 45.8	1 45.8	36	
36	1 8.7	1 10.1	1 12.0	1 14.6	1 18.1	1 22.5	1 28.2	1 35.5	1 45.0	1 45.0	24	
48	1 8.1	1 9.4	1 11.3	1 13.9	1 17.3	1 21.6	1 27.3	1 34.5	1 43.8	1 43.8	12	
7 0	1 7.2	1 8.5	1 10.4	1 12.9	1 16.3	1 20.6	1 26.1	1 33.2	1 42.4	1 42.4	17 0	
12	1 6.2	1 7.4	1 9.2	1 11.8	1 15.0	1 19.3	1 24.7	1 31.7	1 40.7	1 40.7	16 48	
24	1 4.9	1 6.2	1 8.0	1 10.4	1 13.6	1 17.8	1 23.1	1 29.9	1 38.8	1 38.8	36	
36	1 3.5	1 4.7	1 6.5	1 8.9	1 12.0	1 16.1	1 21.2	1 27.9	1 36.5	1 36.5	24	
48	1 2.0	1 3.1	1 4.8	1 7.1	1 10.2	1 14.1	1 19.2	1 25.6	1 34.0	1 34.0	12	
8 0	1 0.2	1 1.3	1 3.0	1 5.2	1 8.2	1 12.0	1 16.9	1 23.2	1 31.3	1 31.3	16 0	
12	0 58.3	0 59.4	1 1.0	1 3.1	1 6.0	1 9.7	1 14.4	1 20.5	1 28.3	1 28.3	15 48	
24	0 56.2	0 57.3	0 58.8	1 0.9	1 3.6	1 7.2	1 11.7	1 17.5	1 25.1	1 25.1	36	
36	0 54.0	0 55.0	0 56.5	0 58.5	1 1.1	1 4.5	1 8.8	1 14.4	1 21.7	1 21.7	24	
48	0 51.6	0 52.6	0 54.0	0 55.9	0 58.4	1 1.6	1 5.8	1 11.1	1 18.0	1 18.0	12	
9 0	0 49.1	0 50.0	0 51.4	0 53.2	0 55.6	0 58.6	1 2.6	1 7.6	1 14.2	1 14.2	15 0	
12	0 46.5	0 47.3	0 48.6	0 50.3	0 52.6	0 55.4	0 59.2	1 3.9	1 10.1	1 10.1	14 48	
24	0 43.7	0 44.5	0 45.7	0 47.3	0 49.4	0 52.1	0 55.6	1 0.1	1 5.9	1 5.9	36	
36	0 40.8	0 41.6	0 42.6	0 44.1	0 46.1	0 48.7	0 51.9	0 56.1	1 1.5	1 1.5	24	
48	0 37.8	0 38.5	0 39.5	0 40.9	0 42.7	0 45.1	0 48.1	0 51.9	0 57.0	0 57.0	12	
10 0	0 34.7	0 35.3	0 36.3	0 37.5	0 39.2	0 41.4	0 44.1	0 47.7	0 52.2	0 52.2	14 0	
12	0 31.5	0 32.1	0 32.9	0 34.1	0 35.6	0 37.5	0 40.0	0 43.2	0 47.4	0 47.4	13 48	
24	0 28.2	0 28.7	0 29.5	0 30.5	0 31.9	0 33.6	0 35.8	0 38.7	0 42.5	0 42.5	36	
36	0 24.9	0 25.3	0 26.0	0 26.9	0 28.1	0 29.6	0 31.6	0 34.1	0 37.4	0 37.4	24	
48	0 21.5	0 21.8	0 22.4	0 23.2	0 24.2	0 25.5	0 27.2	0 29.4	0 32.2	0 32.2	12	
11 0	0 18.0	0 18.3	0 18.8	0 19.4	0 20.3	0 21.4	0 22.8	0 24.6	0 27.0	0 27.0	13 0	
12	0 14.4	0 14.7	0 15.1	0 15.6	0 16.3	0 17.2	0 18.3	0 19.8	0 21.7	0 21.7	12 48	
24	0 10.8	0 11.0	0 11.3	0 11.7	0 12.2	0 12.9	0 13.8	0 14.9	0 16.3	0 16.3	36	
36	0 7.2	0 7.4	0 7.6	0 7.8	0 8.2	0 8.7	0 9.2	0 10.0	0 10.9	0 10.9	24	
48	0 3.6	0 3.7	0 3.8	0 3.9	0 4.1	0 4.4	0 4.6	0 5.0	0 5.5	0 5.5	12	
12 0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	12 0	

AZIMUTH OF POLARIS AT ALL HOUR ANGLES, 1915.

For hour angles 0^h to 12^h the star is west of north, and for hour angles 12^h to 24^h it is east of north.

Lat.		52°								54°								56°								58°								60°								61°								62°								63°								64°								Lat.		H. A.	
I. A.		°		′		″		°		′		″		°		′		″		°		′		″		°		′		″		°		′		″		°		′		″		°		′		″		h		m																									
0		0		0.0		0		0.0		0		0.0		0		0.0		0		0.0		0		0.0		0		0.0		0		0.0		0		0.0		0		0.0		0		0.0		24		0																													
12		0		6.0		0		6.3		0		6.6		0		7.0		0		7.4		0		7.7		0		7.9		0		8.2		0		8.5		0		8.8		23		48																																	
24		0		11.9		0		12.5		0		13.2		0		14.0		0		14.8		0		15.3		0		15.8		0		16.4		0		17.0		0		17.6		36																																			
36		0		17.9		0		18.8		0		19.8		0		20.9		0		22.2		0		22.9		0		23.7		0		24.6		0		25.5		0		26.4		24																																			
48		0		23.7		0		24.9		0		26.2		0		27.8		0		29.5		0		30.4		0		31.5		0		32.6		0		33.8		0		34.8		12																																			
1		0		29.5		0		31.0		0		32.6		0		34.5		0		36.7		0		37.9		0		39.2		0		40.6		0		42.1		0		43.6		23		0																																	
12		0		35.3		0		37.0		0		39.0		0		41.2		0		43.8		0		45.2		0		46.8		0		48.4		0		50.2		0		52.0		22		48																																	
24		0		40.9		0		42.9		0		45.2		0		47.8		0		50.8		0		52.4		0		54.2		0		56.2		0		58.3		0		60.4		36																																			
36		0		46.4		0		48.6		0		51.2		0		54.2		0		57.6		0		59.5		1		1.5		1		3.7		1		6.1		1		7.6		24																																			
48		0		51.7		0		54.3		0		57.2		1		0.4		1		4.2		1		6.3		1		8.6		1		11.1		1		13.7		1		16.4		12																																			
2		0		56.9		0		59.7		1		2.9		1		6.5		1		10.7		1		13.0		1		15.5		1		18.2		1		21.1		1		24.0		22		0																																	
12		1		2.0		1		5.0		1		8.5		1		12.4		1		16.9		1		19.4		1		22.1		1		25.1		1		28.2		1		31.3		21		48																																	
24		1		6.8		1		10.1		1		13.8		1		18.0		1		22.9		1		25.6		1		28.5		1		31.7		1		35.1		1		38.6		36																																			
36		1		11.5		1		15.0		1		19.0		1		23.5		1		28.7		1		31.6		1		34.7		1		38.0		1		41.7		1		44.6		24																																			
48		1		16.0		1		19.7		1		23.9		1		28.7		1		34.2		1		37.2		1		40.5		1		44.1		1		47.9		1		51.8		12																																			
3		0		120.2		1		24.1		1		28.5		1		33.6		1		39.4		1		42.6		1		46.1		1		49.8		1		53.9		1		58.0		21		0																																	
12		1		24.2		1		28.3		1		33.0		1		38.2		1		44.3		1		47.7		1		51.3		1		55.2		1		59.5		1		64.0		20		48																																	
24		1		28.0		1		32.2		1		37.1		1		42.6		1		48.9		1		52.4		1		56.2		2		0.3		2		4.7		2		9.6		36																																			
36		1		31.5		1		35.9		1		41.0		1		46.7		1		53.2		1		56.9		2		0.8		2		5.0		2		9.6		2		14.5		24																																			
48		1		34.7		1		39.3		1		44.5		1		50.4		1		57.2		2		1.0		2		5.0		2		9.4		2		14.1		2		18.6		12																																			
4		0		137.7		1		42.4		1		47.8		1		53.9		2		0.8		2		4.7		2		8.9		2		13.4		2		18.3		2		23.2		20		0																																	
12		1		40.4		1		45.3		1		50.8		1		57.0		2		4.1		2		8.1		2		12.4		2		17.0		2		22.0		2		26.9		19		48																																	
24		1		42.8		1		47.8		1		53.4		1		59.8		2		7.1		2		11.1		2		15.5		2		20.2		2		25.3		2		30.2		36																																			
36		1		45.0		1		50.0		1		55.7		2		2.2		2		9.6		2		13.8		2		18.2		2		23.0		2		28.2		2		33.1		24																																			
48		1		46.8		1		51.9		1		57.7		2		4.3		2		11.8		2		16.0		2		20.5		2		25.4		2		30.6		2		35.7		12																																			
5		0		148.3		1		53.5		1		59.4		2		6.0		2		13.6		2		17.9		2		22.4		2		27.4		2		32.7		2		38.0		19		0																																	
12		1		49.5		1		54.8		2		0.7		2		7.4		2		15.1		2		19.4		2		24.0		2		28.9		2		34.3		2		39.6		18		48																																	
24		1		50.5		1		55.7		2		1.7		2		8.5		2		16.2		2		20.5		2		25.1		2		30.0		2		35.4		2		40.7		36																																			
36		1		51.1		1		56.4		2		2.3		2		9.1		2		16.8		2		21.2		2		25.8		2		30.8		2		36.2		2		41.5		24																																			
48		1		51.4		1		56.7		2		2.6		2		9.5		2		17.2		2		21.5		2		26.1		2		31.1		2		36.5		2		41.8		12																																			
6		0		151.4		1		56.7		2		2.6		2		9.4		2		17.1		2		21.4		2		26.0		2		31.0		2		36.4		2		41.8		18		0																																	
12		1		51.1		1		56.4		2		2.2		2		9.0		2		16.7		2		20.9		2		25.5		2		30.5		2		35.8		2		41.1		17		48																																	
24		1		50.5		1		55.7		2		1.6		2		8.3		2		15.9		2		20.1		2		24.6		2		29.6		2		34.8		2		40.1		36																																			
36		1		49.6		1		54.8		2		0.5		2		7.2		2		14.7		2		18.9		2		23.4		2		28.2		2		33.5		2		38.6		24																																			
48		1		48.4		1		53.5		1		59.2		2		5.7		2		13.2		2		17.3		2		21.7		2		26.5		2		31.7		2		36.8		12																																			
7		0		146.9		1		51.9		1		57.6		2		4.0		2		11.3		2		15.3		2		19.7		2		24.4		2		29.5		2		34.6		17		0																																	
12		1		45.1		1		50.0		1		55.6		2		1.8		2		9.0		2		13.0		2		17.3		2		21.9		2		26.9		2		32.0		16		48																																	
24		1		43.0		1		47.9		1		53.3		1		59.4		2		6.5		2		10.4		2		14.5		2		19.0		2		23.9		2		29.0		36																																			
36		1		40.7		1		45.4		1		50.7		1		56.7		2		3.5		2		7.3		2		11.4		2		15.8		2		20.5		2		25.6		24																																			
48		1		38.1		1		42.7		1		47.8		1		53.6		2		0.3		2		4.0		2		8.0		2		12.2		2		16.8		2		21.9		12																																			
8		0		135.2		1		39.7		1		44.6		1		50.3		1		56.7		2		0.3		2		4.2		2		8.3		2		12.7		2		17.8		16		0																																	
12		1		32.1		1		36.4		1		41.2		1		46.7		1		52.9		1		56.3		2		0.0		2		4.0		2		8.3		2		13.4		15		48																																	
24		1		28.8		1		32.9		1		37.5		1		42.7		1		48.7		1		52.0		1		55.6		1		59.4		2		3.5		2		9.0		36																																			
36		1		25.2		1		29.1		1		33.5		1		38.6		1		44.3		1		47.4		1		50.8		1		54.5		1		58.4		1		63.5		24																																			
48		1		21.4		1		25.1		1		29.3		1		34.1		1		39.6		1		42.6		1		45.8		1		49.3		1		53.1		1		57.2		12																																			
9		0		117.4		1		20.9		1		24.9		1		29.4		1		34.6		1		37.5		1		40.6		1		43.9		1		47.4		1		51.5		15		0																																	
12		1		13.1		1		16.5		1		20.3		1		24.6		1		29.5		1		32.2		1		35.1		1		38.2		1		41.6		1		45.7		14		48																																	
24		1		8.7		1		11.9		1		15.4		1		19.4		1		24.1		1		26.6		1		29.3		1		32.2		1		35.4		1		39.5		36																																			
36		1		4.1		1		7.1		1		10.4		1		14.1		1		18.4		1		20.8		1		23.3		1		26.0		1		29.0		1		32.1		24																																			
48		0		59.4		1		2.1		1		5.1		1		8.6		1		12.6		1		14.8		1		17.1		1		19.6		1		22.4		1		25.																																					

AZIMUTH OF POLARIS AT ELONGATION, 1915.

Decl. Lat.	88° 51' 0"			88° 51' 10"			88° 51' 20"			88° 51' 30"			88° 51' 40"			88° 51' 50"			Variation for—	
	°	'	"	°	'	"	°	'	"	°	'	"	°	'	"	°	'	"	1' of Lat.	1' of L.
5 0	1	9	15.8	1	9	5.8	1	8	55.7	1	8	45.7	1	8	35.7	1	8	25.6	+0.10	-1.00
5 20	1	9	18.0	1	9	8.0	1	8	57.9	1	8	47.9	1	8	37.8	1	8	27.8	0.11	1.00
5 40	1	9	20.3	1	9	10.3	1	9	0.2	1	8	50.2	1	8	40.1	1	8	30.1	0.12	1.00
6 0	1	9	22.8	1	9	12.8	1	9	2.7	1	8	52.6	1	8	42.6	1	8	32.5	0.13	1.01
6 20	1	9	25.4	1	9	15.4	1	9	5.3	1	8	55.2	1	8	45.2	1	8	35.1	0.14	1.01
6 40	1	9	28.2	1	9	18.1	1	9	8.0	1	8	58.0	1	8	47.9	1	8	37.8	+0.14	-1.01
7 0	1	9	31.1	1	9	21.0	1	9	10.9	1	9	0.9	1	8	50.8	1	8	40.7	0.15	1.01
7 20	1	9	34.1	1	9	24.1	1	9	14.0	1	9	3.9	1	8	53.8	1	8	43.7	0.16	1.01
7 40	1	9	37.3	1	9	27.3	1	9	17.2	1	9	7.1	1	8	57.0	1	8	46.9	0.16	1.01
8 0	1	9	40.7	1	9	30.6	1	9	20.5	1	9	10.4	1	9	0.3	1	8	50.2	0.17	1.01
8 20	1	9	44.2	1	9	34.1	1	9	24.0	1	9	13.9	1	9	3.8	1	8	53.6	+0.18	-1.01
8 40	1	9	47.8	1	9	37.7	1	9	27.6	1	9	17.5	1	9	7.4	1	8	57.2	0.18	1.01
9 0	1	9	51.6	1	9	41.5	1	9	31.4	1	9	21.2	1	9	11.1	1	9	1.0	0.19	1.01
9 20	1	9	55.5	1	9	45.4	1	9	35.3	1	9	25.2	1	9	15.0	1	9	4.9	0.20	1.01
9 40	1	9	59.6	1	9	49.5	1	9	39.4	1	9	29.2	1	9	19.1	1	9	8.9	0.21	1.01
10 0	1	10	3.8	1	9	53.7	1	9	43.6	1	9	33.4	1	9	23.3	1	9	13.1	+0.22	-1.02
10 20	1	10	8.2	1	9	58.1	1	9	47.9	1	9	37.8	1	9	27.6	1	9	17.4	0.22	1.02
10 40	1	10	12.8	1	10	2.6	1	9	52.4	1	9	42.3	1	9	32.1	1	9	21.9	0.23	1.02
11 0	1	10	17.5	1	10	7.3	1	9	57.1	1	9	46.9	1	9	36.8	1	9	26.6	0.24	1.02
11 20	1	10	22.3	1	10	12.1	1	10	1.9	1	9	51.7	1	9	41.6	1	9	31.4	0.24	1.02
11 40	1	10	27.3	1	10	17.1	1	10	6.9	1	9	56.7	1	9	46.5	1	9	36.3	+0.25	-1.02
12 0	1	10	32.5	1	10	22.3	1	10	12.1	1	10	1.8	1	9	51.6	1	9	41.4	0.26	1.02
12 20	1	10	37.8	1	10	27.6	1	10	17.3	1	10	7.1	1	9	56.9	1	9	46.6	0.27	1.02
12 40	1	10	43.2	1	10	33.0	1	10	22.8	1	10	12.5	1	10	2.3	1	9	52.0	0.28	1.03
13 0	1	10	49.0	1	10	38.7	1	10	28.4	1	10	18.1	1	10	7.9	1	9	57.6	0.29	1.03
13 20	1	10	54.7	1	10	44.4	1	10	34.2	1	10	23.9	1	10	13.6	1	10	3.3	+0.29	-1.03
13 40	1	11	0.6	1	10	50.4	1	10	40.1	1	10	29.8	1	10	19.5	1	10	9.2	0.30	1.03
14 0	1	11	6.7	1	10	56.5	1	10	46.2	1	10	35.8	1	10	25.5	1	10	15.2	0.31	1.03
14 20	1	11	13.0	1	11	2.7	1	10	52.4	1	10	42.1	1	10	31.7	1	10	21.4	0.32	1.03
14 40	1	11	19.4	1	11	9.1	1	10	58.8	1	10	48.4	1	10	38.1	1	10	27.8	0.32	1.03
15 0	1	11	26.0	1	11	15.7	1	11	5.4	1	10	55.0	1	10	44.6	1	10	34.3	+0.33	-1.03
15 20	1	11	32.8	1	11	22.5	1	11	12.1	1	11	1.7	1	10	51.4	1	10	41.0	0.34	1.04
15 40	1	11	39.7	1	11	29.4	1	11	19.0	1	11	8.6	1	10	58.2	1	10	47.8	0.35	1.04
16 0	1	11	46.8	1	11	36.5	1	11	26.1	1	11	15.7	1	11	5.2	1	10	54.8	0.36	1.04
16 20	1	11	54.1	1	11	43.7	1	11	33.3	1	11	22.9	1	11	12.4	1	11	2.0	0.37	1.04
16 40	1	12	1.5	1	11	51.1	1	11	40.7	1	11	30.3	1	11	19.8	1	11	9.4	+0.38	-1.04
17 0	1	12	9.2	1	11	58.7	1	11	48.3	1	11	37.8	1	11	27.4	1	11	16.9	0.38	1.05
17 20	1	12	16.9	1	12	6.5	1	11	56.0	1	11	45.5	1	11	35.1	1	11	24.6	0.39	1.05
17 40	1	12	24.9	1	12	14.4	1	12	4.0	1	11	53.5	1	11	43.0	1	11	32.5	0.40	1.05
18 0	1	12	33.1	1	12	22.6	1	12	12.1	1	12	1.5	1	11	51.0	1	11	40.5	0.41	1.05
18 20	1	12	41.4	1	12	30.9	1	12	20.3	1	12	9.8	1	11	59.3	1	11	48.7	+0.42	-1.05
18 40	1	12	50.0	1	12	39.4	1	12	28.8	1	12	18.2	1	12	7.7	1	11	57.1	0.43	1.06
19 0	1	12	58.6	1	12	48.0	1	12	37.4	1	12	26.9	1	12	16.3	1	12	5.7	0.44	1.06
19 20	1	13	7.4	1	12	56.8	1	12	46.2	1	12	35.6	1	12	25.1	1	12	14.5	0.45	1.06
19 40	1	13	16.5	1	13	5.9	1	12	55.3	1	12	44.6	1	12	34.0	1	12	23.4	0.46	1.06
20 0	1	13	25.7	1	13	15.1	1	13	4.4	1	12	53.8	1	12	43.2	1	12	32.5	+0.46	-1.06
20 20	1	13	35.2	1	13	24.5	1	13	13.8	1	13	3.2	1	12	52.5	1	12	41.8	0.47	1.07
20 40	1	13	44.7	1	13	34.1	1	13	23.4	1	13	12.7	1	13	2.0	1	12	51.3	0.48	1.07
21 0	1	13	54.6	1	13	43.9	1	13	33.2	1	13	22.5	1	13	11.7	1	13	1.0	0.49	1.07
21 20	1	14	4.6	1	13	53.9	1	13	43.1	1	13	32.4	1	13	21.6	1	13	10.9	0.50	1.07
21 40	1	14	14.7	1	14	4.0	1	13	53.3	1	13	42.5	1	13	31.7	1	13	21.0	+0.51	-1.08
22 0	1	14	25.2	1	14	14.4	1	14	3.6	1	13	52.8	1	13	42.0	1	13	31.2	0.52	1.08
22 20	1	14	35.8	1	14	25.0	1	14	14.2	1	14	3.4	1	13	52.5	1	13	41.7	0.53	1.08
22 40	1	14	46.5	1	14	35.7	1	14	24.9	1	14	14.1	1	14	3.2	1	13	52.4	0.54	1.08
23 0	1	14	57.5	1	14	46.7	1	14	35.9	1	14	25.0	1	14	14.1	1	14	3.3	0.55	1.09
23 20	1	15	8.8	1	14	57.9	1	14	47.0	1	14	36.1	1	14	25.2	1	14	14.3	+0.56	-1.09
23 40	1	15	20.2	1	15	9.3	1	14	58.4	1	14	47.5	1	14	36.5	1	14	25.6	0.57	1.09
24 0	1	15	31.8	1	15	20.9	1	15	10.0	1	14	59.0	1	14	48.1	1	14	37.1	0.58	1.09
24 20	1	15	43.7	1	15	32.7	1	15	21.8	1	15	10.8	1	14	59.8	1	14	48.8	0.60	1.10
24 40	1	15	55.8	1	15	44.8	1	15	33.8	1	15	22.8	1	15	11.8	1	15	0.8	0.61	1.10
25 0	1	16	8.0	1	15	57.0	1	15	46.0	1	15	34.9	1	15	23.9	1	15	12.9	+0.62	-1.10

AZIMUTH OF POLARIS AT ELONGATION, 1915.

Decl. t.	88° 51' 0"		88° 51' 10"		88° 51' 20"		88° 51' 30"		88° 51' 40"		88° 51' 50"		Variation for—	
													r' of Lat.	r'' of δ.
° ' "	° ' "	° ' "	° ' "	° ' "	° ' "	° ' "	° ' "	° ' "	° ' "	° ' "	° ' "	° ' "	" "	" "
25 0	1 16 8.0	1 15 57.0	1 15 46.0	1 15 34.9	1 15 23.9	1 15 12.9	+0.62	-1.10						
25 20	1 16 20.5	1 16 9.5	1 15 58.4	1 15 47.4	1 15 36.3	1 15 25.2	0.63	1.11						
25 40	1 16 33.3	1 16 22.2	1 16 11.1	1 16 0.0	1 15 48.9	1 15 37.8	0.64	1.11						
26 0	1 16 46.2	1 16 35.1	1 16 24.0	1 16 12.9	1 16 1.7	1 15 50.6	0.65	1.11						
26 20	1 16 59.4	1 16 48.3	1 16 37.1	1 16 26.0	1 16 14.8	1 16 3.6	0.66	1.11						
26 40	1 17 12.8	1 17 1.7	1 16 50.5	1 16 39.3	1 16 28.1	1 16 16.9	+0.68	-1.12						
27 0	1 17 26.5	1 17 15.3	1 17 4.1	1 16 52.8	1 16 41.6	1 16 30.4	0.69	1.12						
27 20	1 17 40.4	1 17 29.2	1 17 17.9	1 17 6.6	1 16 55.4	1 16 44.1	0.70	1.13						
27 40	1 17 54.5	1 17 43.3	1 17 32.0	1 17 20.7	1 17 9.4	1 16 58.1	0.71	1.13						
28 0	1 18 8.9	1 17 57.6	1 17 46.3	1 17 34.9	1 17 23.6	1 17 12.3	0.72	1.13						
28 20	1 18 23.5	1 18 12.2	1 18 0.8	1 17 49.5	1 17 38.1	1 17 26.8	+0.74	-1.14						
28 40	1 18 38.4	1 18 27.0	1 18 15.6	1 18 4.3	1 17 52.8	1 17 41.5	0.75	1.14						
29 0	1 18 53.6	1 18 42.2	1 18 30.7	1 18 19.3	1 18 7.8	1 17 56.4	0.76	1.14						
29 20	1 19 8.9	1 18 57.5	1 18 46.0	1 18 34.6	1 18 23.1	1 18 11.6	0.77	1.15						
29 40	1 19 24.6	1 19 13.1	1 19 1.6	1 18 50.1	1 18 38.6	1 18 27.1	0.79	1.15						
30 0	1 19 40.5	1 19 29.0	1 19 17.5	1 19 5.9	1 18 54.4	1 18 42.8	+0.80	-1.15						
30 10	1 19 48.6	1 19 37.1	1 19 25.5	1 19 13.9	1 19 2.4	1 18 50.8	0.81	1.16						
30 20	1 19 56.7	1 19 45.2	1 19 33.6	1 19 22.0	1 19 10.4	1 18 58.8	0.81	1.16						
30 30	1 20 4.9	1 19 53.4	1 19 41.8	1 19 30.1	1 19 18.5	1 19 6.9	0.82	1.16						
30 40	1 20 13.2	1 20 1.6	1 19 50.0	1 19 38.4	1 19 26.7	1 19 15.1	0.83	1.16						
30 50	1 20 21.5	1 20 9.9	1 19 58.3	1 19 46.6	1 19 35.0	1 19 23.3	+0.84	-1.16						
31 0	1 20 30.0	1 20 18.3	1 20 6.6	1 19 55.0	1 19 43.3	1 19 31.6	0.84	1.17						
31 10	1 20 38.4	1 20 26.8	1 20 15.1	1 20 3.4	1 19 51.7	1 19 40.0	0.85	1.17						
31 20	1 20 47.0	1 20 35.3	1 20 23.6	1 20 11.9	1 20 0.2	1 19 48.5	0.86	1.17						
31 30	1 20 55.6	1 20 43.9	1 20 32.2	1 20 20.4	1 20 8.7	1 19 57.0	0.86	1.17						
31 40	1 21 4.3	1 20 52.6	1 20 40.8	1 20 29.1	1 20 17.3	1 20 5.6	+0.87	-1.17						
31 50	1 21 13.0	1 21 1.3	1 20 49.5	1 20 37.8	1 20 26.0	1 20 14.2	0.88	1.18						
32 0	1 21 21.9	1 21 10.1	1 20 58.3	1 20 46.5	1 20 34.8	1 20 23.0	0.88	1.18						
32 10	1 21 30.8	1 21 19.0	1 21 7.2	1 20 55.4	1 20 43.6	1 20 31.8	0.89	1.18						
32 20	1 21 39.8	1 21 28.0	1 21 16.2	1 21 4.3	1 20 52.5	1 20 40.6	0.90	1.18						
32 30	1 21 48.9	1 21 37.0	1 21 25.2	1 21 13.3	1 21 1.5	1 20 49.6	+0.91	-1.19						
32 40	1 21 58.0	1 21 46.1	1 21 34.3	1 21 22.4	1 21 10.5	1 20 58.6	0.91	1.19						
32 50	1 22 7.2	1 21 55.3	1 21 43.4	1 21 31.5	1 21 19.6	1 21 7.7	0.92	1.19						
33 0	1 22 16.5	1 22 4.6	1 21 52.7	1 21 40.7	1 21 28.8	1 21 16.9	0.93	1.19						
33 10	1 22 25.9	1 22 13.9	1 22 2.0	1 21 50.0	1 21 38.1	1 21 26.2	0.94	1.20						
33 20	1 22 35.3	1 22 23.4	1 22 11.4	1 21 59.4	1 21 47.4	1 21 35.5	+0.95	-1.20						
33 30	1 22 44.9	1 22 32.9	1 22 20.9	1 22 8.9	1 21 56.9	1 21 44.9	0.95	1.20						
33 40	1 22 54.4	1 22 42.4	1 22 30.4	1 22 18.4	1 22 6.4	1 21 54.4	0.96	1.20						
33 50	1 23 4.2	1 22 52.1	1 22 40.1	1 22 28.0	1 22 16.0	1 22 3.9	0.97	1.20						
34 0	1 23 13.9	1 23 1.8	1 22 49.8	1 22 37.7	1 22 25.6	1 22 13.6	0.97	1.21						
34 10	1 23 23.7	1 23 11.7	1 22 59.6	1 22 47.5	1 22 35.4	1 22 23.3	+0.98	-1.21						
34 20	1 23 33.7	1 23 21.6	1 23 9.4	1 22 57.3	1 22 45.2	1 22 33.1	0.99	1.21						
34 30	1 23 43.7	1 23 31.5	1 23 19.4	1 23 7.3	1 22 55.1	1 22 43.0	1.00	1.21						
34 40	1 23 53.8	1 23 41.6	1 23 29.4	1 23 17.3	1 23 5.1	1 22 53.0	1.01	1.22						
34 50	1 24 3.9	1 23 51.7	1 23 39.6	1 23 27.4	1 23 15.2	1 23 3.0	1.02	1.22						
35 0	1 24 14.2	1 24 2.0	1 23 49.8	1 23 37.5	1 23 25.3	1 23 13.1	+1.02	-1.22						
35 10	1 24 24.5	1 24 12.3	1 24 0.0	1 23 47.8	1 23 35.6	1 23 23.4	1.03	1.22						
35 20	1 24 35.0	1 24 22.7	1 24 10.4	1 23 58.2	1 23 45.9	1 23 33.6	1.04	1.23						
35 30	1 24 45.5	1 24 33.2	1 24 20.9	1 24 8.6	1 23 56.3	1 23 44.0	1.05	1.23						
35 40	1 24 56.0	1 24 43.7	1 24 31.4	1 24 19.1	1 24 6.8	1 23 54.5	1.06	1.23						
35 50	1 25 6.7	1 24 54.4	1 24 42.1	1 24 29.7	1 24 17.4	1 24 5.0	+1.07	-1.23						
36 0	1 25 17.5	1 25 5.1	1 24 52.8	1 24 40.4	1 24 28.0	1 24 15.7	1.08	1.24						
36 10	1 25 28.3	1 25 16.0	1 25 3.6	1 24 51.2	1 24 38.8	1 24 26.4	1.09	1.24						
36 20	1 25 39.3	1 25 26.9	1 25 14.5	1 25 2.1	1 24 49.6	1 24 37.2	1.10	1.24						
36 30	1 25 50.3	1 25 37.9	1 25 25.5	1 25 13.0	1 25 0.6	1 24 48.2	1.11	1.24						
36 40	1 26 1.5	1 25 49.0	1 25 36.6	1 25 24.1	1 25 11.6	1 24 59.2	+1.12	-1.25						
36 50	1 26 12.7	1 26 0.2	1 25 47.7	1 25 35.2	1 25 22.7	1 25 10.2	1.13	1.25						
37 0	1 26 24.0	1 26 11.5	1 25 59.0	1 25 46.5	1 25 34.0	1 25 21.4	1.13	1.25						
37 10	1 26 35.5	1 26 22.9	1 26 10.3	1 25 57.8	1 25 45.2	1 25 32.7	1.14	1.26						
37 20	1 26 47.0	1 26 34.4	1 26 21.8	1 26 9.2	1 25 56.6	1 25 44.1	1.15	1.26						
37 30	1 26 58.5	1 26 46.0	1 26 33.3	1 26 20.7	1 26 8.1	1 25 55.5	+1.16	-1.26						

AZIMUTH OF POLARIS AT ELONGATION, 1915.

Decl. Lat.	88° 51' 0"	88° 51' 10"	88° 51' 20"	88° 51' 30"	88° 51' 40"	88° 51' 50"	Variation for—	
							1" of Lat.	1" of d.
37 30	1 26 58.5	1 26 46.0	1 26 33.3	1 26 20.7	1 26 8.1	1 25 55.5	+1.16	-1.26
37 40	1 27 10.2	1 26 57.6	1 26 45.0	1 26 32.4	1 26 19.7	1 26 7.1	1.17	1.26
37 50	1 27 22.0	1 27 9.4	1 26 56.7	1 26 44.1	1 26 31.4	1 26 18.7	1.18	1.27
38 0	1 27 33.9	1 27 21.3	1 27 8.6	1 26 55.9	1 26 43.2	1 26 30.5	1.19	1.27
38 10	1 27 45.9	1 27 33.2	1 27 20.5	1 27 7.8	1 26 55.1	1 26 42.3	1.20	1.27
38 20	1 27 58.0	1 27 45.3	1 27 32.5	1 27 19.8	1 27 7.0	1 26 54.3	+1.21	-1.27
38 30	1 28 10.2	1 27 57.5	1 27 44.7	1 27 31.9	1 27 19.1	1 27 6.3	1.22	1.28
38 40	1 28 22.5	1 28 9.7	1 27 56.9	1 27 44.1	1 27 31.3	1 27 18.5	1.23	1.28
38 50	1 28 34.9	1 28 22.1	1 28 9.2	1 27 56.4	1 27 43.6	1 27 30.7	1.24	1.28
39 0	1 28 47.4	1 28 34.5	1 28 21.7	1 28 8.8	1 27 55.9	1 27 43.1	1.25	1.29
39 10	1 29 0.0	1 28 47.1	1 28 34.2	1 28 21.3	1 28 8.4	1 27 55.5	+1.26	-1.29
39 20	1 29 12.7	1 28 59.8	1 28 46.9	1 28 33.9	1 28 21.0	1 28 8.1	1.27	1.29
39 30	1 29 25.5	1 29 12.6	1 28 59.6	1 28 46.7	1 28 33.7	1 28 20.7	1.28	1.29
39 40	1 29 38.4	1 29 25.5	1 29 12.5	1 28 59.5	1 28 46.5	1 28 33.5	1.29	1.30
39 50	1 29 51.5	1 29 38.5	1 29 25.4	1 29 12.4	1 28 59.4	1 28 46.4	1.30	1.30
40 0	1 30 4.5	1 29 51.6	1 29 38.5	1 29 25.5	1 29 12.4	1 28 59.4	+1.31	-1.30
40 10	1 30 17.8	1 30 4.8	1 29 51.7	1 29 38.6	1 29 25.5	1 29 12.4	1.32	1.31
40 20	1 30 31.2	1 30 18.1	1 30 5.0	1 29 51.9	1 29 38.8	1 29 25.7	1.33	1.31
40 30	1 30 44.7	1 30 31.6	1 30 18.4	1 30 5.3	1 29 52.1	1 29 39.0	1.34	1.31
40 40	1 30 58.3	1 30 45.1	1 30 31.9	1 30 18.8	1 30 5.6	1 29 52.4	1.35	1.32
40 50	1 31 12.0	1 30 58.8	1 30 45.6	1 30 32.4	1 30 19.1	1 30 5.9	+1.36	-1.32
41 0	1 31 25.8	1 31 12.6	1 30 59.3	1 30 46.1	1 30 32.8	1 30 19.6	1.38	1.32
41 10	1 31 39.7	1 31 26.5	1 31 13.2	1 30 59.9	1 30 46.6	1 30 33.3	1.39	1.33
41 20	1 31 53.8	1 31 40.5	1 31 27.2	1 31 13.9	1 31 0.5	1 30 47.2	1.40	1.33
41 30	1 32 8.0	1 31 54.7	1 31 41.3	1 31 27.9	1 31 14.6	1 31 1.2	1.41	1.33
41 40	1 32 22.2	1 32 8.9	1 31 55.5	1 31 42.1	1 31 28.7	1 31 15.3	+1.42	-1.34
41 50	1 32 36.6	1 32 23.3	1 32 9.8	1 31 56.4	1 31 43.0	1 31 29.6	1.44	1.34
42 0	1 32 51.2	1 32 37.8	1 32 24.3	1 32 10.8	1 31 57.4	1 31 43.9	1.45	1.35
42 10	1 33 5.8	1 32 52.4	1 32 38.9	1 32 25.4	1 32 11.9	1 31 58.4	1.47	1.35
42 20	1 33 20.6	1 33 7.1	1 32 53.6	1 32 40.1	1 32 26.5	1 32 13.0	1.48	1.35
42 30	1 33 35.5	1 33 22.0	1 33 8.4	1 32 54.9	1 32 41.3	1 32 27.7	+1.50	-1.36
42 40	1 33 50.6	1 33 37.0	1 33 23.4	1 33 9.8	1 32 56.2	1 32 42.6	1.51	1.36
42 50	1 34 5.7	1 33 52.1	1 33 38.5	1 33 24.9	1 33 11.2	1 32 57.6	1.52	1.36
43 0	1 34 21.0	1 34 7.4	1 33 53.7	1 33 40.0	1 33 26.4	1 33 12.7	1.53	1.37
43 10	1 34 36.4	1 34 22.8	1 34 9.1	1 33 55.4	1 33 41.6	1 33 27.9	1.55	1.37
43 20	1 34 52.0	1 34 38.3	1 34 24.6	1 34 10.8	1 33 57.0	1 33 43.3	+1.56	-1.37
43 30	1 35 7.7	1 34 54.0	1 34 40.2	1 34 26.4	1 34 12.6	1 33 58.8	1.57	1.37
43 40	1 35 23.5	1 35 9.7	1 34 55.9	1 34 42.1	1 34 28.3	1 34 14.4	1.59	1.37
43 50	1 35 39.5	1 35 25.7	1 35 11.8	1 34 57.9	1 34 44.1	1 34 30.2	1.60	1.39
44 0	1 35 55.5	1 35 41.7	1 35 27.8	1 35 13.9	1 35 0.0	1 34 46.1	1.61	1.39
44 10	1 36 11.8	1 35 57.9	1 35 44.0	1 35 30.0	1 35 16.1	1 35 2.2	+1.63	-1.39
44 20	1 36 28.2	1 36 14.3	1 36 0.3	1 35 46.3	1 35 32.3	1 35 18.4	1.65	1.40
44 30	1 36 44.8	1 36 30.8	1 36 16.7	1 36 2.7	1 35 48.7	1 35 34.7	1.66	1.40
44 40	1 37 1.5	1 36 47.4	1 36 33.3	1 36 19.3	1 36 5.2	1 35 51.2	1.67	1.41
44 50	1 37 18.3	1 37 4.2	1 36 50.1	1 36 36.0	1 36 21.9	1 36 7.8	1.68	1.41
45 0	1 37 35.3	1 37 21.1	1 37 6.9	1 36 52.8	1 36 38.7	1 36 24.5	+1.69	-1.42
45 10	1 37 52.4	1 37 38.2	1 37 24.0	1 37 9.8	1 36 55.6	1 36 41.4	1.71	1.42
45 20	1 38 9.6	1 37 55.4	1 37 41.2	1 37 26.9	1 37 12.7	1 36 58.5	1.72	1.42
45 30	1 38 27.0	1 38 12.8	1 37 58.5	1 37 44.2	1 37 29.9	1 37 15.7	1.74	1.43
45 40	1 38 44.6	1 38 30.3	1 38 16.0	1 38 1.7	1 37 47.3	1 37 33.0	1.75	1.43
45 50	1 39 2.3	1 38 48.0	1 38 33.6	1 38 19.3	1 38 4.9	1 37 50.5	+1.77	-1.43
46 0	1 39 20.2	1 39 5.8	1 38 51.4	1 38 37.0	1 38 22.6	1 38 8.2	1.78	1.44
46 10	1 39 38.2	1 39 23.8	1 39 9.3	1 38 54.9	1 38 40.5	1 38 26.0	1.80	1.44
46 20	1 39 56.4	1 39 41.9	1 39 27.5	1 39 13.0	1 38 58.5	1 38 44.0	1.82	1.45
46 30	1 40 14.8	1 40 0.3	1 39 45.7	1 39 31.2	1 39 16.7	1 39 2.1	1.83	1.45
46 40	1 40 33.3	1 40 18.7	1 40 4.2	1 39 49.6	1 39 35.0	1 39 20.4	+1.85	-1.46
46 50	1 40 52.0	1 40 37.4	1 40 22.8	1 40 8.1	1 39 53.5	1 39 38.9	1.87	1.46
47 0	1 41 10.9	1 40 56.2	1 40 41.5	1 40 26.9	1 40 12.2	1 39 57.5	1.88	1.47
47 10	1 41 29.9	1 41 15.2	1 41 0.5	1 40 45.8	1 40 31.0	1 40 16.3	1.90	1.47
47 20	1 41 49.1	1 41 34.3	1 41 19.6	1 41 4.8	1 40 50.1	1 40 35.3	1.92	1.48
47 30	1 42 8.5	1 41 53.7	1 41 38.8	1 41 24.0	1 41 9.2	1 40 54.4	+1.94	-1.48

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AZIMUTH OF POLARIS AT ELONGATION, 1915.

Decl. Lat.							Variation for—	
	88° 51' 0"	88° 51' 10"	88° 51' 20"	88° 51' 30"	88° 51' 40"	88° 51' 50"	r' of Lat.	r' of d.
0	0	0	0	0	0	0	"	"
47 30	1 42 8.5	1 41 53.7	1 41 38.8	1 41 24.0	1 41 9.2	1 40 54.4	+1.94	-1.48
47 40	1 42 28.0	1 42 13.2	1 41 58.3	1 41 43.5	1 41 28.6	1 41 13.8	1.96	1.48
47 50	1 42 47.7	1 42 32.8	1 42 17.9	1 42 3.0	1 41 48.1	1 41 33.2	1.98	1.49
48 0	1 43 7.6	1 42 52.7	1 42 37.7	1 42 22.8	1 42 7.8	1 41 52.9	1.99	1.49
48 10	1 43 27.7	1 43 12.7	1 42 57.7	1 42 42.7	1 42 27.7	1 42 12.8	2.01	1.50
48 20	1 43 48.0	1 43 33.0	1 43 17.9	1 43 2.9	1 42 47.8	1 42 32.8	+2.03	-1.50
48 30	1 44 8.5	1 43 53.4	1 43 38.3	1 43 23.2	1 43 8.1	1 42 53.0	2.05	1.51
48 40	1 44 29.2	1 44 14.0	1 43 58.8	1 43 43.7	1 43 28.5	1 43 13.4	2.07	1.52
48 50	1 44 50.0	1 44 34.7	1 44 19.5	1 44 4.3	1 43 49.2	1 43 34.0	2.09	1.52
49 0	1 45 11.0	1 44 55.7	1 44 40.5	1 44 25.2	1 44 10.0	1 43 54.7	2.10	1.53
49 10	1 45 32.2	1 45 16.9	1 45 1.6	1 44 46.3	1 44 31.0	1 44 15.7	+2.12	-1.53
49 20	1 45 53.6	1 45 38.3	1 45 22.9	1 45 7.6	1 44 52.2	1 44 36.9	2.14	1.53
49 30	1 46 15.2	1 45 59.8	1 45 44.4	1 45 29.0	1 45 13.6	1 44 58.2	2.16	1.54
49 40	1 46 37.0	1 46 21.6	1 46 6.1	1 45 50.7	1 45 35.2	1 45 19.8	2.18	1.54
49 50	1 46 59.0	1 46 43.6	1 46 28.1	1 46 12.6	1 45 57.0	1 45 41.5	2.20	1.55
50 0	1 47 21.3	1 47 5.8	1 46 50.2	1 46 34.6	1 46 19.1	1 46 3.5	+2.22	-1.56
50 10	1 47 43.7	1 47 28.1	1 47 12.5	1 46 56.9	1 46 41.3	1 46 25.7	2.24	1.56
50 20	1 48 6.3	1 47 50.7	1 47 35.1	1 47 19.4	1 47 3.7	1 46 48.1	2.26	1.57
50 30	1 48 29.2	1 48 13.5	1 47 57.8	1 47 48.1	1 47 26.4	1 47 10.6	2.29	1.57
50 40	1 48 52.3	1 48 36.6	1 48 20.8	1 48 5.0	1 47 49.2	1 47 33.5	2.31	1.58
50 50	1 49 15.6	1 48 59.8	1 48 44.0	1 48 28.2	1 48 12.3	1 47 56.5	+2.33	-1.58
51 0	1 49 39.1	1 49 23.3	1 49 7.4	1 48 51.5	1 48 35.6	1 48 19.7	2.35	1.59
51 10	1 50 2.9	1 49 47.0	1 49 31.1	1 49 15.1	1 48 59.1	1 48 43.2	2.38	1.59
51 20	1 50 26.9	1 50 10.9	1 49 54.9	1 49 38.9	1 49 22.9	1 49 6.9	2.41	1.60
51 30	1 50 51.1	1 50 35.1	1 50 19.0	1 50 2.9	1 49 46.9	1 49 30.8	2.43	1.61
51 40	1 51 15.6	1 50 59.5	1 50 43.4	1 50 27.2	1 50 11.1	1 49 55.0	+2.46	-1.61
51 50	1 51 40.3	1 51 24.1	1 51 7.9	1 50 51.7	1 50 35.5	1 50 19.4	2.48	1.62
52 0	1 52 5.2	1 51 49.0	1 51 32.7	1 51 16.5	1 51 0.2	1 50 44.0	2.49	1.62
52 10	1 52 30.4	1 52 14.1	1 51 57.8	1 51 41.5	1 51 25.1	1 51 8.8	2.51	1.63
52 20	1 52 55.7	1 52 39.4	1 52 23.1	1 52 6.7	1 51 50.3	1 51 34.0	2.54	1.64
52 30	1 53 21.5	1 53 5.0	1 52 48.6	1 52 32.2	1 52 15.7	1 51 59.3	+2.57	-1.64
52 40	1 53 47.4	1 53 30.9	1 53 14.4	1 52 57.9	1 52 41.4	1 52 24.9	2.59	1.65
52 50	1 54 13.5	1 53 57.0	1 53 40.4	1 53 23.9	1 53 7.3	1 52 50.8	2.62	1.66
53 0	1 54 40.0	1 54 23.4	1 54 6.8	1 53 50.1	1 53 33.5	1 53 16.9	2.64	1.66
53 10	1 55 6.7	1 54 50.0	1 54 33.3	1 54 16.6	1 54 0.0	1 53 43.3	2.67	1.67
53 20	1 55 33.6	1 55 16.9	1 55 0.2	1 54 43.4	1 54 26.7	1 54 9.9	+2.70	-1.68
53 30	1 56 0.9	1 55 44.1	1 55 27.3	1 55 10.5	1 54 53.6	1 54 36.8	2.73	1.68
53 40	1 56 28.4	1 56 11.5	1 55 54.7	1 55 37.8	1 55 20.9	1 55 4.0	2.75	1.69
53 50	1 56 56.2	1 56 39.3	1 56 22.3	1 56 5.4	1 55 48.4	1 55 31.5	2.78	1.69
54 0	1 57 24.3	1 57 7.3	1 56 50.2	1 56 33.2	1 56 16.2	1 55 59.2	2.80	1.70
54 10	1 57 52.6	1 57 35.5	1 57 18.5	1 57 1.4	1 56 44.3	1 56 27.2	+2.83	-1.71
54 20	1 58 21.2	1 58 4.1	1 57 47.0	1 57 29.8	1 57 12.7	1 56 55.5	2.87	1.72
54 30	1 58 50.2	1 58 33.0	1 58 15.8	1 57 58.6	1 57 41.3	1 57 24.1	2.90	1.72
54 40	1 59 19.5	1 59 2.2	1 58 44.9	1 58 27.6	1 58 10.3	1 57 53.0	2.93	1.73
54 50	1 59 49.0	1 59 31.6	1 59 14.3	1 58 56.9	1 58 39.5	1 58 22.2	2.96	1.74
55 0	2 0 18.9	2 0 1.4	1 59 44.0	1 59 26.5	1 59 9.1	1 58 51.6	+2.98	-1.75
55 10	2 0 49.0	2 0 31.5	2 0 14.0	1 59 56.5	1 59 39.0	1 59 21.4	3.01	1.75
55 20	2 1 19.5	2 1 1.9	2 0 44.3	2 0 26.7	2 0 9.1	1 59 51.6	3.04	1.76
55 30	2 1 50.3	2 1 32.6	2 1 15.0	2 0 57.3	2 0 39.6	2 0 22.0	3.07	1.77
55 40	2 2 21.5	2 2 3.7	2 1 45.9	2 1 28.2	2 1 10.4	2 0 52.7	3.10	1.77
55 50	2 2 52.8	2 2 35.0	2 2 17.2	2 1 59.4	2 1 41.6	2 1 23.8	+3.13	-1.78
56 0	2 3 24.6	2 3 6.7	2 2 48.8	2 2 30.9	2 2 13.1	2 1 55.2	3.17	1.79
56 10	2 3 56.7	2 3 38.8	2 3 20.8	2 3 2.8	2 2 44.9	2 2 26.9	3.21	1.80
56 20	2 4 29.2	2 4 11.2	2 3 53.1	2 3 35.1	2 3 17.0	2 2 59.0	3.24	1.80
56 30	2 5 2.0	2 4 43.9	2 4 25.8	2 4 7.6	2 3 49.5	2 3 31.4	3.28	1.81
56 40	2 5 35.2	2 5 17.0	2 4 58.8	2 4 40.6	2 4 22.3	2 4 4.1	+3.31	-1.82
56 50	2 6 8.7	2 5 50.4	2 5 32.1	2 5 13.8	2 4 55.5	2 4 37.2	3.34	1.83
57 0	2 6 42.6	2 6 24.2	2 6 5.8	2 5 47.5	2 5 29.1	2 5 10.7	3.37	1.84
57 10	2 7 16.8	2 6 58.4	2 6 39.9	2 6 21.5	2 6 3.0	2 5 44.6	3.42	1.84
57 20	2 7 51.5	2 7 32.9	2 7 14.4	2 6 55.9	2 6 37.3	2 6 18.8	3.46	1.85
57 30	2 8 26.4	2 8 7.8	2 7 49.2	2 7 30.6	2 7 12.0	2 6 53.4	+3.50	-1.86

AZIMUTH OF POLARIS AT ELONGATION, 1915.

Decl. Lat.	88° 51' 0"			88° 51' 10"			88° 51' 20"			88° 51' 30"			88° 51' 40"			88° 51' 50"			Variation for—	
																			r' of Lat.	r" of d.
• ,	° ,	' ,	"	° ,	' ,	"	° ,	' ,	"	° ,	' ,	"	° ,	' ,	"	° ,	' ,	"	"	"
57 30	2	8	26.4	2	8	7.8	2	7	49.2	2	7	30.6	2	7	12.0	2	6	53.4	+3.50	-1.86
57 40	2	9	1.9	2	8	43.2	2	8	24.5	2	8	5.8	2	7	47.0	2	7	28.3	3.54	1.87
57 50	2	9	37.7	2	9	18.9	2	9	0.1	2	8	41.3	2	8	22.5	2	8	3.7	3.57	1.88
58 0	2	10	13.8	2	9	55.0	2	9	36.1	2	9	17.2	2	8	58.3	2	8	39.4	3.61	1.89
58 10	2	10	50.4	2	10	31.5	2	10	12.5	2	9	53.5	2	9	34.6	2	9	15.8	3.66	1.90
58 20	2	11	27.4	2	11	8.4	2	10	49.3	2	10	30.3	2	10	11.2	2	9	52.2	+3.70	-1.91
58 30	2	12	4.8	2	11	45.7	2	11	26.6	2	11	7.4	2	10	48.3	2	10	29.1	3.74	1.92
58 40	2	12	42.7	2	12	23.5	2	12	4.3	2	11	45.0	2	11	25.8	2	11	6.5	3.78	1.92
58 50	2	13	21.0	2	13	1.7	2	12	42.3	2	12	23.0	2	12	3.7	2	11	44.4	3.82	1.93
59 0	2	13	59.7	2	13	40.3	2	13	20.9	2	13	1.5	2	12	42.0	2	12	22.6	3.87	1.94
59 10	2	14	38.9	2	14	19.4	2	13	59.9	2	13	40.3	2	13	20.8	2	13	1.3	+3.92	-1.95
59 20	2	15	18.5	2	14	58.9	2	14	39.3	2	14	19.7	2	14	0.0	2	13	40.4	3.96	1.96
59 30	2	15	58.6	2	15	38.9	2	15	19.2	2	14	59.5	2	14	39.7	2	14	20.0	4.00	1.97
59 40	2	16	39.1	2	16	19.3	2	15	59.5	2	15	39.7	2	15	19.9	2	15	0.1	4.05	1.98
59 50	2	17	20.2	2	17	0.2	2	16	40.3	2	16	20.4	2	16	0.5	2	15	40.6	4.10	1.99
60 0	2	18	1.7	2	17	41.7	2	17	21.6	2	17	1.6	2	16	41.6	2	16	21.6	+4.15	-2.00

TABLE Va.

FOR REDUCING TO ELONGATION, OBSERVATIONS MADE NEAR ELONGATION.

Azimuth at Elong.									Azimuth at Elong.
*Time.	1° 10'	1° 20'	1° 30'	1° 40'	1° 50'	2° 0'	2° 10'	2° 20'	Time
m	"	"	"	"	"	"	"	"	m
0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0
1	+ 0.1	+ 0.1	+ 0.1	+ 0.1	+ 0.1	+ 0.1	+ 0.1	+ 0.2	1
2	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.3	2
3	0.4	0.4	0.4	0.5	0.6	0.6	0.7	0.7	3
4	0.6	0.7	0.8	0.9	1.0	1.1	1.2	1.3	4
5	+ 1.0	+ 1.1	+ 1.3	+ 1.4	+ 1.6	+ 1.7	+ 1.9	+ 2.0	5
6	1.4	1.6	1.8	2.1	2.3	2.5	2.7	2.9	6
7	2.0	2.2	2.5	2.8	3.1	3.4	3.7	3.9	7
8	2.6	2.9	3.3	3.7	4.0	4.4	4.8	5.1	8
9	3.3	3.7	4.2	4.7	5.1	5.5	6.0	6.5	9
10	+ 4.0	+ 4.6	+ 5.1	+ 5.7	+ 6.3	+ 6.8	+ 7.4	+ 8.0	10
11	4.9	5.6	6.2	6.9	7.6	8.3	9.0	9.7	11
12	5.8	6.6	7.4	8.2	9.0	9.9	10.7	11.5	12
13	6.8	7.8	8.7	9.7	10.6	11.6	12.5	13.5	13
14	7.8	9.0	10.1	11.2	12.3	13.4	14.5	15.7	14
15	+ 9.0	+ 10.3	+ 11.6	+ 12.9	+ 14.1	+ 15.4	+ 16.7	+ 18.0	15
16	10.2	11.7	13.2	14.6	16.1	17.5	19.0	20.4	16
17	11.5	13.2	14.9	16.4	18.2	19.8	21.4	23.0	17
18	12.9	14.8	16.7	18.5	20.4	22.2	24.0	25.9	18
19	14.4	16.5	18.6	20.7	22.7	24.7	26.8	28.9	19
20	+ 16.0	+ 18.3	+ 20.6	+ 22.9	+ 25.1	+ 27.4	+ 29.7	+ 32.0	20
21	17.7	20.2	22.7	25.2	27.7	30.2	32.7	35.3	21
22	19.4	22.1	24.9	27.6	30.4	33.2	35.9	38.7	22
23	21.2	24.2	27.2	30.2	33.2	36.3	39.2	42.3	23
24	23.0	26.3	29.6	32.9	36.2	39.4	42.7	46.0	24
25	+ 25.0	+ 28.6	+ 32.1	+ 35.7	+ 39.3	+ 42.7	+ 46.3	+ 49.9	25
26	27.0	30.9	34.7	38.6	42.4	46.3	50.1	54.0	26
27	29.1	33.3	37.5	41.6	45.7	50.0	54.0	58.2	27
28	31.3	35.8	40.3	44.7	49.2	53.7	58.1	62.6	28
29	33.6	38.4	43.2	48.0	52.8	57.6	62.3	67.1	29
30	+ 35.9	+ 41.1	+ 46.2	+ 51.4	+ 56.5	+ 61.6	+ 66.7	+ 71.8	30

*Sideral time from elongation.

[Eph 15]

FOR FINDING THE TIMES OF UPPER AND LOWER CULMINATION OF POLARIS FROM THE OBSERVED TIMES WHEN THE STAR IS ON THE SAME VERTICAL CIRCLE WITH THE STARS ζ URSÆ MAJORIS (MIZAR) *SUB POLO* AND δ CASSIOPEIÆ *SUB POLO*, RESPECTIVELY.

Except at high latitudes, the pole star at either upper or lower culmination furnishes a simple and convenient method for laying down a meridian line on the earth's surface at points in the northern hemisphere. When the local time is unknown and accurate astronomical instruments are not available, the time of culmination of Polaris may be found by observing the instant when Polaris is vertically above (has the same azimuth as) ζ Ursæ Majoris (Mizar) below the pole, or δ Cassiopeiæ below the pole. In the former case, for the year 1915, Polaris is approaching upper culmination and in the latter case it is approaching lower culmination. The mean time interval which elapses between the observed times above mentioned and upper or lower culmination, as the case may be, are given for ζ Ursæ Majoris and δ Cassiopeiæ for ten-day intervals in the following table. This method can not be used at places south of 30° north latitude.

TABLE VI.

MEAN TIME INTERVAL.

ζ URSÆ MAJORIS (MIZAR). (Upper culmination of Polaris.)						δ CASSIOPEIÆ. (Lower culmination of Polaris.)							
1915	Lat.	40°	45°	50°	55°	60°	1915	Lat.	35°	40°	45°	50°	55°
		m s	m s	m s	m s	m s			m s	m s	m s	m s	m s
Jan.	1	8 18	8 16	8 14	8 12	8 9	Jan.	1	9 23	9 24	9 26	9 29	9 31
	11	8 8	8 6	8 4	8 2	7 59		11	9 13	9 14	9 16	9 18	9 20
	21	7 56	7 55	7 53	7 51	7 48		21	9 1	9 3	9 5	9 7	9 9
July	10	8 13	8 12	8 10	8 7	8 4		31	8 51	8 52	8 54	8 56	8 58
	20	8 24	8 23	8 21	8 18	8 15	Feb.	10	8 41	8 43	8 44	8 46	8 49
	30	8 35	8 33	8 31	8 28	8 25		20	8 32	8 33	8 35	8 37	8 39
Aug.	9	8 45	8 44	8 42	8 39	8 36	Mar.	2	8 23	8 25	8 26	8 28	8 31
	19	8 55	8 53	8 51	8 49	8 46		12	8 18	8 19	8 20	8 22	8 25
	29	9 4	9 2	9 0	8 57	8 54		22	8 13	8 15	8 16	8 18	8 20
Sept.	8	9 11	9 9	9 7	9 4	9 1	Apr.	1	8 10	8 12	8 13	8 15	8 17
	18	9 19	9 17	9 15	9 12	9 8		11	8 10	8 11	8 13	8 15	8 17
	28	9 23	9 21	9 19	9 16	9 13		21	8 13	8 14	8 16	8 18	8 20
Oct.	8	9 26	9 24	9 22	9 19	9 16	May	1	8 16	8 17	8 19	8 21	8 23
	18	9 28	9 26	9 24	9 21	9 18		11	8 21	8 22	8 24	8 26	8 28
	28	9 29	9 27	9 25	9 22	9 19		21	8 28	8 29	8 31	8 33	8 35
Nov.	7	9 28	9 26	9 24	9 21	9 17		31	8 37	8 38	8 40	8 42	8 44
	17	9 24	9 22	9 20	9 17	9 14	June	10	8 46	8 47	8 49	8 51	8 54
	27	9 19	9 17	9 15	9 12	9 9		20	8 56	8 57	8 59	9 1	9 4
Dec.	7	9 13	9 11	9 9	9 6	9 3		30	9 7	9 9	9 11	9 13	9 15
	17	9 5	9 3	9 1	8 58	8 55	July	10	9 19	9 20	9 22	9 24	9 27
	27	8 56	8 54	8 52	8 49	8 46		20	9 30	9 31	9 33	9 35	9 38
	31	8 53	8 51	8 49	8 46	8 43		30	9 40	9 42	9 44	9 47	9 49

[Eph 15]

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ON THE ARRANGEMENT AND USE OF THE AMERICAN EPHEMERIS AND NAUTICAL ALMANAC.

The matter contained in the first 175 pages of this volume is intended primarily for the use of navigators, and consists of ephemerides of the Sun and Moon and of the planets Mercury, Venus, Mars, Jupiter, and Saturn. The remainder of the book contains ephemerides of all the planets, of their satellites, of 825 fixed stars, elements for the computation of predictions of eclipses of the Sun and Moon and of occultations of stars, tables of the pole star, Polaris, and in addition miscellaneous data for the convenience and use of astronomers, surveyors, and the general public.

TIME.

There are in general use three different kinds of time, True Solar Time—also called Apparent Solar Time—Mean Solar Time, and Sidereal Time.

True or Apparent Solar Time is measured by the diurnal motion of the Sun, the length of the day being the interval between two successive transits of the Sun over the same meridian, and the time of day being the hour-angle of the Sun westward from the meridian. Owing to the obliquity of the ecliptic and to the lack of uniformity of the motion of the Earth in its orbit, the rate of motion of the Sun in hour-angle and the length of the apparent solar day are not constant. Therefore clocks and chronometers can not be regulated to apparent solar time, which may, however, be determined by observations of the Sun when visible.

Mean Solar Time is measured by the motion of a fictitious body called the mean Sun which is supposed to move uniformly in the celestial equator, completing the circuit in one tropical year. Since mean solar time is uniform and regular in its passage, clocks and watches may be regulated to it, and those in ordinary use are usually so regulated.

Mean solar time can not, of course, be determined by direct observation, but may be determined indirectly by correcting observations of the Sun for the equation of time (page 702), or by converting to mean time sidereal time determined by observations of fixed stars (page 701).

The Mean Solar Day is the unit of mean solar time, and is equal in length to the mean or average of all the true or apparent solar days of the year. It may be otherwise defined as the interval of time elapsing between two successive transits of the mean Sun across the meridian of any place.

Sidereal Time or star time, in general terms, is measured by the diurnal motion of the fixed stars, or, speaking more precisely, by the diurnal motion of that point on the celestial equator called the vernal equinox, from which the right ascensions of the heavenly bodies are measured. Astronomical clocks regulated to sidereal time are called sidereal clocks. Sidereal time may be determined from observations of stars whose right ascensions are known.

A *Sidereal Day* is very nearly the length of time in which the Earth rotates on its axis and is accurately defined as the time interval between two successive transits of the vernal equinox over the same meridian. The sidereal day is shorter than the mean solar day by $3^m 56^s.555$ sidereal time or $3^m 55^s.909$ mean solar time, the tropical year of 365.2422 mean solar days containing 366.2422 sidereal days. Sidereal time and the length of the sidereal day are subject to slight irregularities on account of small differences between the positions of the true and mean equinoxes.

The mean solar and sidereal days are each divided into 24 hours. About March 23 (civil date) of each year, about two days after the vernal equinox, there is an instant when the face of a sidereal clock shows the same time as a mean time clock, and the former gains on the latter $3^m 56^s.555$ sidereal time per mean solar day, so that at the end of a year it will have gained one sidereal day and will again agree with the mean time clock.

The *Equation of Time* is the difference in hour-angle between the true Sun and the mean Sun. The true Sun is sometimes before and sometimes behind the mean Sun by an amount which varies from zero to about 16 minutes. The equation of time is given on pages I and II of each month of the Greenwich Ephemeris, and in the Solar Ephemeris for the Meridian of Washington, pages 518-525.

The *Civil Day* begins at midnight and comprises 24 hours, the hours being counted from 0 to 12 in two series; the first, marked A. M., running from midnight to noon, and the second, marked P. M., running from noon to midnight.

The *Astronomical Day* begins at noon on the civil day of the same date, the 24 hours being counted from 0 to 24, running from noon of one day to noon of the next following day. Astronomical time as well as civil time may be either apparent or mean.

The civil day begins twelve hours before the astronomical day; therefore the first half of the civil day corresponds to the last half of the preceding astronomical day, and the last half of the civil day coincides with the first half of the astronomical day of the same date. Thus, January 9, 2 o'clock, A. M., civil time, is January 8, 14^h , astronomical time; and January 9, 2 o'clock, P. M., civil time, is January 9, 2^h , astronomical time.

PRECEPTS FOR THE CONVERSION OF TIME.

To convert *Sidereal Time at any place into Mean Solar Time*, subtract the sidereal time of local mean noon for the beginning of the astronomical day, from the given sidereal time, and convert the interval of sidereal time thus found into mean time by means of Table II, page 686.

To convert *Mean Solar Time at any place into Sidereal Time*, convert the given interval of mean time (counted from mean noon) into sidereal time by means of Table III, page 689, and add the sidereal time of local mean noon for the beginning of the astronomical day.

Processes similar to the above may be employed, using the mean time of sidereal noon given on page III of the Greenwich Ephemeris instead of the sidereal time of mean noon.

To convert *Apparent Solar Time into Mean Solar Time*, add or subtract the equation of time as indicated on page I of the Greenwich Ephemeris, or add algebraically the equation of time taken from the Washington Solar Ephemeris, pages 518-525.

To convert *Mean Solar Time into Apparent Solar Time*, add or subtract the equation of time as indicated on page II of the Greenwich Ephemeris, or subtract algebraically the equation of time taken from the Washington Solar Ephemeris, pages 518-525.

To convert *Civil Time into Astronomical Time*.—If the civil time is marked A. M., take one from the day and add twelve to the hours; if the civil time is marked P. M., take away the designation P. M.

To convert *Astronomical Time into Civil Time*.—If the astronomical time is less than twelve hours, write P. M. after it; if greater than twelve hours, subtract twelve hours from it, mark the result A. M., and add one to the days. For example, October 3, 23 hours, astronomical time, is October 4, 11 o'clock, A. M., civil time.

To convert *Mean Solar or Sidereal Time of any meridian B to that of another meridian A*, add the difference of longitude expressed in time when A is east of B, and subtract the difference of longitude when A is west of B.

PART I.—THE EPHEMERIS FOR THE MERIDIAN OF GREENWICH.

Pages 2-145 give data arranged under the heads of the several months, and are therefore designated as the Calendar. Each month covers 12 pages, numbered from I to XII, whose contents are as follows:

Page I contains, for Greenwich apparent noon of each day, *The Sun's Apparent Right Ascension and Declination*, and the *Equation of Time*. Adjoining columns contain the differences of these quantities for one hour. By multiplying any one of these differences by the hours and parts of an hour from Greenwich apparent noon, and adding the product to, or subtracting it from, the corresponding quantity at noon, according as that quantity is increasing or decreasing, we obtain the value of the quantity in question for any given Greenwich apparent time. The hourly differences are given for the instant of apparent noon at Greenwich, but when great accuracy is required they should be interpolated for half the hours and parts of an hour of the Greenwich apparent time.

The *Equation of Time* given on page I is the mean time of apparent noon, or the hour-angle of the mean Sun at that instant. The heading of the column directs how the equation is to be applied to apparent time, or the time given by an observation of the Sun, in order to get mean time. When in the course of the month there is a change from addition to subtraction or the reverse (as in the months of April and June), the two different directions are separated by a line, while a corresponding line below points out the dates between which the change occurs.

The Sun's Semidiameter and the *Sidereal Time of Semidiameter Passing Meridian* are also given on page I. The semidiameter is used in reducing the altitude of the upper or lower limb of the Sun to the altitude of the center; and in reducing the angular distance between the limb of the Sun and any other object, to the distance from the center of the Sun. The sidereal time of semidiameter passing the meridian is employed in obtaining the passage of the Sun's center over the wires of a transit

instrument, when the passage of one limb only has been observed. The quantity found in this column is to be added to the time of transit of the first, or western, limb; and to be subtracted from the time of transit of the second, or eastern, limb.

This page is chiefly used when the Sun is observed on the meridian, at which instant the local apparent time is $0^h 0^m 0^s$. The longitude from Greenwich expressed in time is then the corresponding Greenwich apparent time before or after noon according as the longitude is east or west. The longitude of any place is therefore the factor employed in reducing the quantities on this page to apparent noon at that place.

The right ascension of the Sun thus reduced is the sidereal time of local apparent noon, and the difference between that and the clock time of the meridian passage of the Sun is the error of the clock on sidereal time.

The declination of the Sun reduced to the meridian, or apparent noon, of the place, is required in finding the latitude from a meridian altitude of the Sun.

As an example of the use of page I:—

Let the Sun's declination be required at apparent noon, 1915, April 15, at a place whose longitude is $89^\circ 40'$, or $5^h 58^m 40^s$ west from Greenwich:—

Local apparent time	April 15,	$0^h 0^m 0^s$
Longitude from Greenwich (additive)		$5^h 58^m 40^s$
Greenwich apparent time	April 15,	$5^h 58^m 40^s$

Reducing the minutes and seconds to decimals of an hour, we find that this moment is $5^h.978$ after Greenwich apparent noon on April 15, or $18^h.022$ before Greenwich apparent noon on April 16.

On page 38 of the Ephemeris we find that the change of declination in one hour is:

April 15, at Greenwich apparent noon	"
April 16, at Greenwich apparent noon	$+53.94$
	$+53.54$
Difference for one day	-0.40

If great exactness is desired, we find the amount of this hourly difference for the time which is halfway between Greenwich noon and the time of observation; that is, for 3 hours after Greenwich noon of the 15th, this being half of 6 hours. Three hours is 0.125 of a day; so the calculation is as follows:

Difference for one hour, April 15	$+53.94$
Change for 0.125 of a day or $-0''.40 \times 0.125$	-0.05
Difference at 3 hours after noon	$+53.89$
$53.89 \times 5.978 = 322''.2 = 5' 22''.2$	
Declination at Greenwich noon, April 15	N. $9^\circ 28' 42''.7$
Change in 5.978 hours (additive)	$5^\circ 22''.2$
Sun's declination at time of observation	N. $9^\circ 34' 4.9''$

When the time of observation is only a few hours before Greenwich noon, it may be better to count the longitude backward from this nearest noon. Thus, in the example just given the time is $18^h.022$ before Greenwich noon of April 16; half this interval is about 0.375 of a day, and the hourly motion for the middle of the

interval is $53''.69$. Then, we find—

Declination at Greenwich noon, April 16 . . .	N.	9	50	12.4
Product of $53''.69 \times 18.022 = 967''.6$ (subtractive)		—	16	7.6
Sun's declination at time of observation . . .	N.	9	34	4.8

It will always be well to make the calculation in both ways, as a check; but if the results differ slightly, the one derived from the nearest noon should be regarded as the more accurate.

Page II contains, for Greenwich mean noon of each day, *The Sun's Apparent Right Ascension and Declination*, the *Equation of Time*, and the *Sidereal Time of Mean Noon*. The hourly changes of these quantities are also given, and may be used in reducing them for the longitude, or to any Greenwich mean time. When great precision is required, these changes should be interpolated for half the Greenwich time, as described in explaining the calculation of the declination.

The *Equation of Time* given on page II is the apparent time of mean noon, and is equivalent to the hour-angle of the true Sun at the instant of mean noon. The heading of the column directs how the equation must be applied to mean time in order to obtain apparent time.

The *Sidereal Time of Mean Noon* is the right ascension of the mean Sun at Greenwich mean noon. It may be reduced for the longitude, or to any Greenwich mean time, by using the hourly difference, $9^s.8565$; or by Table III, page 689 of this volume, for reducing intervals of mean solar to sidereal time.

The right ascensions and declinations on pages I and II are affected both by aberration and nutation, and therefore denote the *apparent* positions of the *true* Sun. Page I is used for observations which depend upon apparent time, as when the Sun is observed on the meridian; while page II is used when the times have been noted by a clock or chronometer regulated to mean time, as is the case in most observations of the Sun out of the meridian.

The Sun's declination is required whenever that body is observed for the purpose of finding latitude, local time, or azimuth, and the equation of time is needed in finding the apparent time when determining the latitude from observations of the Sun out of the meridian.

The sidereal time of mean noon, or right ascension of the mean Sun, is useful in converting mean time to sidereal time. We first find the Greenwich mean time, then the right ascension of the mean Sun for that time, and this being added to the local astronomical mean time will give the sidereal time.

The sidereal time of mean noon, reduced for the longitude of the place, is also used in converting sidereal time to mean time. Subtracting the reduced value from the given sidereal time gives the interval of sidereal time from noon, and that is converted into the required mean time by subtracting from it the corresponding reduction of a sidereal interval to a mean-time interval, taken from Table II, page 686 of this volume. Instead of using Table II, this reduction may be found by multiplying $9^s.8296$ by the hours and parts of an hour of the sidereal interval from noon.

As examples of the use of page II:—

$33281^{\circ} - 1915 = 45$

[Eph 15]

1.—Let the Sun's right ascension and the equation of time be required for 1915, July 13, $10^h 3^m 30^s$, A. M., mean time, at a place whose longitude is $85^\circ 15'$, or $5^h 41^m 0^s$ west of Greenwich.

Local astronomical mean time	July 12,	$22 \ 3 \ 30$
Longitude from Greenwich (additive)		$5 \ 41 \ 0$
Greenwich mean time	July 13,	$3 \ 44 \ 30 = 3^h .7417$

Sun's Right Ascension.

Equation of Time.

July 13, Greenwich noon	$7 \ 26 \ 34.28$	July 13, Greenwich noon	$5 \ 25.71$ (subtractive)
H. D. $10^s .173 \times 3.7417$	$+ \ 38.06$	H. D. $+0^s .316 \times 3.7417$	$+ \ 1.18$
	$7 \ 27 \ 12.34$		$5 \ 26.89$

In this case the hourly differences interpolated to half the interval, or $1^h .87$ after noon, have been used. The equation of time is here subtractive from mean time.

2.—If the sidereal time is required for the same time and place, we have—

July 13, sidereal time (at Greenwich mean noon)	$7 \ 21 \ 8.57$
Reduction for $3^h 44^m 30^s$ from Table III, or $9^s .8565 \times 3.7417$	$+ \ 36.88$
Add the local astronomical mean time	$22 \ 3 \ 30.00$
The required sidereal time is (rejecting 24^h)	$5 \ 25 \ 15.45$

3.—On 1915, July 13, A. M., at a place whose longitude is $85^\circ 15' W.$, suppose the sidereal time to be $5^h 26^m 12^s .44$ and that the corresponding mean time is required.

The astronomical day is July 12; the longitude in time, $+5^h 41^m 0^s$, or $+5^h .6833$

July 12, sidereal time (at Greenwich mean noon)	$7 \ 17 \ 12.01$
Reduction for $5^h 41^m 0^s$ from Table III, or $9^s .8565 \times 5.6833$	$+ \ 56.02$
The sidereal time of local mean noon	$7 \ 18 \ 8.03$
The given sidereal time ($+24^h$, if necessary for the following subtraction)	$29 \ 26 \ 12.44$
Subtracting the first from the second gives the sidereal interval from noon	$22 \ 8 \ 4.41 = 22^h .1346$
Reduction for $22^h 8^m 4^s .41$ from Table II, or $-9^s .8296 \times 22.1346$	$- \ 3 \ 37.57$

The required astronomical mean time is July 12, $22 \ 4 \ 26.84$

Page III contains, for Greenwich mean noon of each day, *The Sun's True Longitude and Latitude*, and the *Logarithm of the Radius Vector of the Earth*. The longitudes of the Sun are the true geometric longitudes, not corrected for aberration. They are given in two columns, headed, respectively, λ and λ' ; λ representing the Sun's longitude counted from the true equinox of the date; and λ' , the same coordinate counted from the mean equinox of the beginning of the Besselian fictitious year. The latitude is referred to the mean ecliptic of the date. Columns of hourly differences are given to facilitate finding the Sun's longitude, or the logarithm of the radius vector, for any hour from noon.

The last column on page III contains the *Mean Time of Sidereal Noon*; that is, the number of hours, minutes, and seconds after Greenwich mean noon when the vernal equinox passes the meridian of Greenwich. It may be reduced to any

meridian, or to any Greenwich sidereal time, by using the hourly difference, $-0^s.8296$, to effect the necessary interpolation. The reduction, however, can be taken directly from Table II for reducing intervals of sidereal time to mean solar time.

This column may be used in converting sidereal time to mean time instead of that on page II. As an illustration, let us take Example 3, above.

It is seen in advance that the sum of the mean time of sidereal noon and the given sidereal time is less than 24 hours. Were it more than 24 hours, the mean time of sidereal noon should be taken out for July 11; that is, the preceding astronomical day.

July 12, the mean time of Greenwich sidereal noon is . . .	$16^h 40^m 3.70^s$
Reduction for longitude from Table II, or $-0^s.8296 \times 5.683$. . .	-55.86
The mean time of local sidereal noon	$16 39 7.84$
Add the given sidereal time	$5 26 12.44 = 5^h.4368$
The sum is	$22 5 20.28$
Reduction for $5^h 26^m 12^s.44$ from Table II, or $-0^s.8296 = 5.4368$. . .	-53.44
The required astronomical mean time July 12, . . .	$22 4 26.84$

Page IV contains *The Moon's Semidiameter* and *Equatorial Horizontal Parallax* for each mean noon and midnight at Greenwich. Columns adjoining those of the horizontal parallax give the change of that quantity in one hour, by means of which it can be reduced to any other Greenwich mean time, in the same way as the Sun's declination and the equation of time in the preceding examples. The sign plus or minus is prefixed to the hourly differences, according as the horizontal parallax is increasing or decreasing.

The reduction of the Moon's semidiameter may be readily found by multiplying the reduction of the horizontal parallax by 0.2725 (see p. xi), or by simply computing the proportional part.

If, for example, the semidiameter of the Moon is to be taken out for 1915, March 10, 7^h, P. M., Greenwich mean time, we see that the difference of the semidiameters at noon and midnight of March 10 is 3''.7; then,

$$12^h : 7^h = 3''.7 : 2''.2$$

which is the correction to be subtracted from the semidiameter at noon, because the semidiameter is decreasing. The Moon's semidiameter for March 10, 7^h, is therefore 15' 51''.1.

The Moon's semidiameter and horizontal parallax are required for all observations of the Moon. When great precision is needed, the hourly differences should be interpolated for half the interval of Greenwich time from noon or midnight, and the horizontal parallax should be corrected for the latitude of the place of observation.

The mean time of *The Moon's Upper Transit* at Greenwich and the *Age of the Moon* are also contained on page IV. The time of transit is given to tenths of a minute, and is accompanied by a column of differences for one hour of longitude, by means of which the local time of the Moon's meridian transit may be computed for any other place whose longitude is known. The age of the Moon, or the time elapsed since the preceding new Moon, is given to tenths of a day.

Pages V–XII contain *The Moon's Right Ascension and Declination* for each day and hour of Greenwich mean time. They are accompanied by columns of differences for one minute, which are also given at each hour. The Greenwich mean time, which is required for taking out these quantities, may either be taken from a well-regulated chronometer, or may be obtained by applying the longitude, converted into time, to the local mean time of the observer. The right ascension or declination is taken out for the given day and hour of Greenwich mean time; the *Diff. for 1 Minute* is multiplied by the minutes and parts of a minute of the Greenwich time, and the product is added to or subtracted from the quantity, according as the latter is increasing or decreasing.

Thus, suppose the Moon's right ascension and declination are required for 1915, January 25, $10^h 10^m 30^s$, astronomical mean time at Greenwich:—

<i>Right Ascension.</i>				<i>Declination.</i>			
	<i>h</i>	<i>m</i>	<i>s</i>		<i>°</i>	<i>'</i>	<i>"</i>
January 25, 10^h	4	4	3.80		N.	26	4 33.1
Diff. $2^s.1777 \times 10.5$			22.87				+ 57.0
January 25, $10^h 10^m 30^s$	4	4	26.67		N.	26	5 30.1

For the sake of precision, the differences here employed have been interpolated for $5^m.2 = 0^s.09$.

Page XII contains also the *Phases of the Moon* and the dates of the *Moon's Perigee and Apogee*, or least and greatest distances from the Earth.

Pages 146–177 contain the geocentric ephemerides of the seven major planets. The places given are apparent positions; that is, they are referred to the equator and true equinox of the date, and are corrected for aberration. All the data except meridian passage are given for the instant of Greenwich mean noon. The column *Meridian Passage* shows the hour, minute, and tenth of that passage of the planet over the meridian of Greenwich which occurs next after the noon of the date.

The right ascension and declination of a planet are required whenever it is observed for time, latitude, or azimuth. The mode of reducing the ephemeris positions of planets to other instants of Greenwich mean time is the same as that given for the Sun on pages 704–707. The local mean time of meridian passage of any planet, at any place, can be found by dividing the proper daily difference of the ephemeris times by 24, multiplying the quotient by the longitude of the place expressed in hours and fractions, and applying the product with its proper sign to the time of Greenwich passage.

Pages 178–199 contain the heliocentric coordinates of the seven major planets, and the logarithms of their distances from the Earth. The *Heliocentric Longitude* is reckoned, not from the true equinox, as in the preceding ephemerides, but from the mean equinox of the date. It is, therefore, necessary to apply nutation, if the longitude from the true equinox is required. The *Daily Motion* is given for the instant of Greenwich mean noon. The column *Reduction to Orbit* contains the correction to be applied to the heliocentric longitude in order to obtain the longitude counted along the orbit of the planet. The latter is equal to the distance from the mean equinox to the node, plus the distance from the node to the planet. The *Heliocentric Latitude* is counted from the mean ecliptic of the date. The

Logarithm of Radius Vector is the logarithm of the distance of the center of the planet from that of the Sun, at the Greenwich mean noon whose date is given in the first column. The last two columns give, respectively, the logarithm of the true distance of the center of the planet from that of the Earth, for the Greenwich noon indicated on the left-hand side of the page, and for the time which is midway between that date and the date next below it. In the case of Mercury, this intermediate date is mean midnight of the same day; in the case of Venus and Mars, it is the mean noon of the day immediately following; in the case of Jupiter and Saturn, it is mean noon of the second day following; and in the case of Uranus and Neptune, mean noon of the fourth day following.

Pages 200–207 contain the rectangular coordinates of the center of the Sun, referred to the center of the Earth as the origin, and to the true equator and equinox of each date as the plane and point of reference. Each coordinate is given both for Greenwich mean noon and for Greenwich mean midnight of the same day. The columns *Reduc. to Mean Eq'x of Jan. 0*, give the corrections to be applied to the coordinates for noon in order to obtain the corresponding coordinates referred to the mean equator and the mean equinox of the beginning of the Besselian fictitious year.

Pages 208–211 contain for every Greenwich mean noon and midnight the apparent geocentric longitude and latitude of the Moon referred to the true ecliptic and equinox of the date.

Page 212 contains the position of the *Moon's Equator*, the *Longitude of the Moon's Perigee*, the *Mean Longitude of the Moon's Ascending Node*, and the *Moon's Mean Longitude*.

Page 213 contains the elements of the *Moon's Libration*, and the *Sun's Aberration and Horizontal Parallax*. The formulæ for finding the libration in longitude and latitude are given on page xi. The *Sun's Aberration* is the quantity which is to be applied to the true longitude of the Sun in order to obtain its apparent longitude. The correction being negative shows that the apparent longitude as affected by aberration is always less than the true longitude. The *Sun's Horizontal Parallax*, given in the last column, is the angle subtended by the equatorial radius of the Earth, as seen from the center of the Sun.

Pages 214, 231–232 contain data for precession and the obliquity of the ecliptic, together with all sensible terms arising from the motions of the equator and ecliptic. To show clearly the relations of these quantities, let

λ = the longitude of any body referred to the true equinox of the date.

λ' = the longitude of the same body referred to the mean equinox of the beginning of the Besselian fictitious year.

ψ_1 = the adopted value of the general precession.

$\delta'\psi$ = the principal term of the nutation in longitude; or, in other words, the correction to be applied to the longitude of a body referred to the mean equinox of date, in order to obtain that longitude as referred to the true equinox, exclusive of short period terms. When the correction is positive, the longitudes referred to the true equinox are greater than those referred to the mean equinox; while the contrary is the case when the correction has a negative sign.

$\delta''\psi$ = the short period terms of nutation in longitude, given on pages 231-232.

ω = the true or apparent obliquity of the ecliptic at the date.

ω' = the mean obliquity of the ecliptic at the beginning of the Besselian fictitious year.

$\delta'\omega$ = the principal term of the nutation of the obliquity of the ecliptic; or, in other words, the correction to be applied to the mean obliquity of date in order to find the true or apparent obliquity, exclusive of short period terms. This quantity is tabulated on page 214, and is positive or negative according as the true obliquity is greater or less than the mean obliquity.

$\delta''\omega$ = the short period terms of nutation in obliquity, given on pages 231-232.

τ = the fraction of a year intervening between the instant when the Sun's mean longitude was 280° and the date for which λ or ω is required.

Then—

$$\begin{aligned}\lambda &= \lambda' + \tau\psi_1 + \delta'\psi + \delta''\psi \\ \omega &= \omega' - 0''.464 \tau + \delta'\omega + \delta''\omega\end{aligned}$$

Page 214 contains, for each fifth Greenwich mean noon throughout the year, certain quantities which may be described in terms of the above notation as follows: The *Precession in Longitude from 1915.0* = $\tau\psi_1$; the *Nutation in Longitude* = $\delta'\psi$; the *Nutation in Right Ascension* = $(\delta'\psi) \cos \omega'$; the *Nutation in Obliquity* = $\delta'\omega$, and the *Obliquity of the Ecliptic* = $\omega - \delta''\omega$, which is the true inclination of the Earth's equator to the ecliptic, exclusive of the terms depending on the Moon's longitude.

PART II.—THE EPHEMERIS FOR THE MERIDIAN OF WASHINGTON.

Pages 216-217 contain formulæ for reducing the positions of fixed stars, including expressions for the Besselian star-numbers and star-constants, and for the independent star-numbers; the whole based upon the constants of the Paris Conference of May, 1896, and expressed in the notation of BESSEL.

Pages 218-221 contain the logarithms of the *Besselian Star-Numbers*, *A*, *B*, *C*, *D*, for each Washington mean midnight, with the values of *E* appended at the bottoms of the pages. The terms of short period have been included. These numbers serve to reduce the mean place of a star at the beginning of the Besselian fictitious year to its apparent place at the dates for which the numbers are given, and in ordinary cases four-figure logarithms suffice; but where extreme accuracy is desired the logarithms of *A*, *C*, and *D* are sometimes needed to five places of decimals. If used in accordance with the English and French notation, the pair of quantities *A* and *B* must be interchanged with the pair *C* and *D*; that is, *A* must be interchanged with *C*, and *B* with *D*. Along with the solar day, the first column contains the sidereal hour of Washington mean midnight for certain dates, and by interpolation among them it is easy to find the sidereal time for which any set of quantities is given.

The following is an example of the reduction of a star to apparent place by the Besselian star-numbers:

Computation of the apparent place of α Aquilæ, July 2, 1915, for the upper transit at Washington.

$\log a$	0.5165	$\log b$	7.2435 ⁿ	$\log c$	8.0427	$\log d$	8.8236 ⁿ
$\log A$	9.8629	$\log B$	0.8181 ⁿ	$\log C$	0.5218	$\log D$	1.3042 ⁿ
$\log a'$	0.5153	$\log b'$	9.9941	$\log c'$	9.4340	$\log d'$	8.4140 ⁿ
$\log Aa$	0.3794	$\log Bb$	8.0616	$\log Cc$	8.5645	$\log Dd$	0.1278
$\log Aa'$	0.3782	$\log Bb'$	0.8122 ⁿ	$\log Cc'$	9.9558	$\log Dd'$	9.7182
<i>Mean Place, 1915.0</i>				$\alpha_0 =$	^h 18 ^m 37 ^s 37.244	$\delta_0 =$	[°] -9 ['] 8 ["] 5.20
				$Aa =$	+ 2.395	$Aa' =$	+ 2.39
				$Bb =$	+ 0.012	$Bb' =$	- 6.49
				$Cc =$	+ 0.037	$Cc' =$	+ 0.90
				$Dd =$	+ 1.342	$Dd' =$	+ 0.52
				$E =$	+ 0.002	$\tau\mu' =$	0.00
				$\tau\mu =$	+ 0.001		
<i>Apparent Place, July 2,</i>					^h 18 ^m 37 ^s 41.033		-9 8 7.88
				$-f' =$	- 0.005		
				$\alpha =$	^h 18 ^m 37 ^s 41.028		

Pages 222-229 contain the *Independent Star-Numbers*, which can frequently be advantageously used instead of the *Besselian Star-Numbers*. The terms of short period have been included. These quantities are connected with those of Bessel by the relations given on page 216, which also contains the formulæ and precepts for the application of both systems of numbers. In order to use the Besselian numbers, it is necessary to have the values of the star-constants, $a, b, c, d, a', b', c', d'$, while the independent star-numbers render it possible to determine the apparent place of a star without computing these star-constants. Four-figure logarithms usually suffice, but where extreme accuracy is desired the logarithms of g and h are needed to five places of decimals, and G and H are needed to one-tenth of a minute of arc. The column τ gives the fraction of a year, counted from the beginning of the Besselian fictitious year to each date.

The following is an example of the reduction of a star to apparent place by the independent star-numbers:

Computation of the apparent place of α Aquilæ, July 2, 1915, for the upper transit at Washington.

$G =$	^h 22 ^m 23.1	$\delta_0 =$	[°] -9 ['] 8.1
$\alpha_0 =$	^h 18 ^m 37.6	$G + \alpha_0 =$	17 ^h 0 ^m .7
$H =$	^h 11 ^m 22.5	$H + \alpha_0 =$	6 0.1
$\log \gamma_0$	8.8239	$\log \gamma_0$	8.8239
$\log g$	1.2050	$\log h$	1.3100
$\sin (G + \alpha_0)$	9.9853 ⁿ	$\sin (H + \alpha_0)$	0.0000
$\tan \delta_0$	9.2063 ⁿ	$\sec \delta_0$	0.0055
$\log (g)$	9.2205	$\log (h)$	0.1394
		$\alpha_0 =$	^h 18 ^m 37 ^s 37.244
		$f =$	+ 2.237
		$(g) =$	+ 0.166
		$(h) =$	+ 1.379
		$\tau\mu =$	+ 0.001
		$\alpha =$	^h 18 ^m 37 ^s 41.027
		$\delta_0 =$	[°] -9 ['] 8 ["] 5.20
$\log g$	1.2050	$\log h$	1.3100
$\cos (G + \alpha_0)$	9.4078 ⁿ	$\cos (H + \alpha_0)$	6.7648
		$\sin \delta_0$	9.2007 ⁿ
$\log (g')$	0.6128 ⁿ	$\log (h')$	7.2755 ⁿ
		$\tau\mu' =$	0.00
		$\delta =$	- 9 8 7.88
$\log i$	0.1591		
$\cos \delta_0$	9.9945		
$\log (i')$	0.1536		

Page 230 contains for every tenth sidereal day the *Besselian* and *Independent Star-Numbers*, exclusive of all short-period terms. They are useful in computing ephemerides of stars, similar to those on pages 287-486, for which constants containing short-period terms should not be employed.

Pages 231-232 contain for Washington mean midnight of each day the short-period terms of the nutation in longitude and obliquity, for use in connection with the formulæ on page 217, and the coefficients mentioned below, which are given for each star on pages 287-486.

Pages 233-250 contain the mean places of eight hundred and twenty-five stars, for the beginning of the Besselian fictitious year, or, in other words, for the moment when the Sun's mean longitude is 280° . The annual variations are to be considered as the differential coefficients of each coordinate with respect to the time at the beginning of the year.

Pages 251-286 contain the apparent positions of fifteen northern circumpolar stars for every upper transit at Washington. The mean solar time of transit is given in the column *Mean Solar Date*, in order that each transit above and below the pole may be readily identified. Suppose, for example, that the transit of Polaris below the pole on January 26 is to be found, and we wish to know whether it precedes or follows the upper transit of the same date. On page 251 we find that the upper transit occurs January 26.2; the lower transit, therefore, occurs January 26.7. But the lower transit following that of July 1 (page 257) does not take place until July 2.3. Hence the lower transit of July 1 precedes the upper one of the same date. A transit occurring very nearly at noon may also be identified without a computation to ascertain the actual mean date, by simply noting the tenth of a day in the column *Mean Solar Date*.

The secant and tangent of the apparent declination for the 15th of each month and the mean place in right ascension and declination for the beginning of the year are given for each star at the foot of the page.

Pages 287-486 contain, for every tenth upper transit at Washington, the apparent places of 800 stars, being all those given in the list of mean places, except the twenty-five circumpolars. The mean solar date in the left-hand column of each page gives the day and tenth of the transit, so that intermediate transits may be readily identified; and to facilitate interpolation, the differences of each coordinate are given for every ten days.

In connection with the ephemeris of each 10-day star there are given at the foot of the page, (1) the secant and the tangent of the mean of the star's greatest and least apparent declinations during the year, (2) the seconds of the mean place in both right ascension and declination for the beginning of the year, and (3) the coefficients of the short-period terms of the nutation, the use of which is explained on page 217.

Pages 487-510 contain ephemerides of ten southern circumpolar stars in all respects similar to those of northern circumpolar stars on pages 251-286.

Pages 511-517 contain the mean errors for 1920 in both right ascension and declination of the places of the 825 stars on pages 233-250 taken from *Astronomical Papers of the American Ephemeris*, Vol. VIII, Part 2, pages 370-382. They furnish data for estimating approximately the accuracy of the Mean Places of the Stars on pages 233-250.

Pages 518–525 contain the *Apparent Right Ascension* and *Declination* of the Sun, both for Washington mean and apparent noon, and the *Hourly Motion* of the Sun in these coordinates; the *Equation of Time*, the *Semidiameter* of the Sun, and the *Sidereal Time of Semidiameter Passing Meridian*, for Washington apparent noon; and, lastly, the *Sidereal Time of Mean Noon*. The hours and minutes of right ascension and the degrees and minutes of declination are always made the same for both mean and apparent noon. In cases where they really differ, the minute which would have been numerically larger is diminished by one, and the seconds increased by sixty, so that the sum of the two remains correct. The hourly motions in right ascension and declination are given for the columns headed *Mean Noon*, but may be regarded as having the same values for apparent noon.

The *Equation of Time for Apparent Noon* is the correction to be applied to apparent time in order to obtain mean time. It is, therefore, mean time minus apparent time. Each number as given is the mean time of transit of the Sun's center over the meridian of Washington, counted from the nearest noon. The use of all the quantities is substantially the same as in the *Ephemeris for the Meridian of Greenwich*.

Pages 526–541 contain the right ascension, declination, semidiameter, and parallax of the Moon at the moment of upper and lower transit over the meridian of Washington. The mean time given in the third column is that of transit of the Moon's center over this meridian. The differences for one hour of longitude are the amounts by which the local mean times of transit over a meridian one hour west of Washington would exceed those given in the column *Mean Time of Transit*, supposing the rate of change to be uniform and equal to what it is at the instant of transit over the meridian of Washington. The next four columns need no especial explanation, except that the differences for one hour of longitude are computed as if the motion of the Moon in right ascension were uniform, or, in other words, they are differential coefficients corresponding to the instants of Washington transit. By means of them, when second differences are taken into account, the position of the Moon can be computed with great exactness for the moment of transit over any meridian not more than one hour distant from Washington. To obtain the same accuracy for more distant meridians, we may proceed as follows: Let F represent either the *Mean Time of Transit*, the *Right Ascension of Center*, or the *Geocentric Declination of Center*, and let D represent the corresponding *Difference for One Hour of Longitude*. Write down three successive values of F , together with the corresponding values of D , and difference the latter as in the following scheme, where the middle values, F_0 and D_0 , belong to the culmination from which is to be derived the value of F for the culmination on the meridian whose longitude is λ :—

Function.	Diff. for 1 Hour of Longitude.	Δ'	Δ''
F_{-1}	D_{-1}	a'	b
F_0	D_0	a''	
F_{+1}	D_{+1}		

Then, for the culmination at the meridian λ

$$F_{\lambda} = F_0 + \lambda D_0 + \frac{\lambda^2}{48}(a' + a'') + \frac{\lambda^3 b}{864}$$

[Eph 15]

where λ must be expressed in hours and decimals of an hour, and reckoned from Washington or from 180° from Washington according as the upper or lower culmination is used for the middle value (F_0). Adding twelve hours to the Washington time of lower transit at Washington gives the local time of upper transit at places whose longitude is 180° from Washington.

The columns of *Sidereal Time of Semidiameter Passing Meridian*, *Geocentric Semidiameter* and *Equatorial Horizontal Parallax* need no explanation, except that they are all given for the moment of transit. The column *Bright Limbs* is given to indicate to the observer which limbs are illuminated. When one limb is full and the terminator is within $1''$ of the opposite limb, both can be well observed, and in such cases both are indicated, the defective limb being indicated by an italic letter or numeral, and the correction for defective illumination (as seen from Washington) being given in a foot-note.

Pages 542-558 contain for each of the seven major planets, the geocentric *Apparent Right Ascension* and *Declination*, the *Horizontal Parallax*, *Semidiameter*, and *Sidereal Time of Semidiameter Passing Meridian*, for the moments of all transits which it is usually desirable to observe over the meridian of Washington. The columns following the dates give the Washington mean times of these transits. The stellar magnitude at opposition for Mars, Jupiter, Saturn, Uranus, and Neptune, respectively, is given at the bottom of the page containing the ephemeris of the planet.

PART III.—PHENOMENA.

This part gives the dates of the principal astronomical phenomena of the year, expressed in Washington mean time, except in the case of the eclipses, which are expressed in Greenwich mean time.

Pages 560-564 contain all necessary data respecting the solar eclipses which occur during the year.

The eclipse elements are given for the moment of conjunction of the Sun and Moon in right ascension, but the subsequent tables and results are computed from the exact positions of these bodies at the several instants referred to. The times and angles designated as the circumstances of a lunar eclipse remain the same throughout all parts of the Earth, and require no explanation beyond a mere statement of the fact that in computing them the geometrical diameter of the Earth's shadow has been augmented in the proportion of 51:50. The principal circumstances of each total and annular eclipse are stated in five lines, as follows:—

The line entitled "Eclipse begins" gives the Greenwich mean time at which the Moon's penumbra first touches the Earth, together with the latitude and longitude of the point of contact.

The line entitled "Central eclipse begins" gives the time when the axis of the Moon's shadow first touches the Earth, and the latitude and longitude of the point of contact follow.

The line entitled "Central eclipse at local apparent noon" gives the time when the axes of the Earth and of the shadow cone lie in the same plane. The latitude and longitude of the point where the axis of the shadow cone then cuts the Earth's surface follow, and there the eclipse will be central and the Sun will be exactly on the meridian.

The lines entitled "Central eclipse ends" and "Eclipse ends" give, respectively, the times when and the localities where these events occur, the phenomena being the converse of those denoted by the similar phrases for the beginning.

In the case of partial solar eclipses the axis of the Moon's shadow does not come into contact with the Earth, and the three lines entitled, respectively, "Central eclipse begins," "Central eclipse at local apparent noon," and "Central eclipse ends," are replaced by a single line entitled "Greatest eclipse," whereon are given the time when and the latitude and longitude where the eclipse attains its greatest magnitude. The latter phenomenon necessarily occurs with the Sun in the horizon.

Maps of the Eclipses.—The regions in which each eclipse is visible are shown upon the map relating to it, from which may be taken approximately, for any place, both the times of the beginning and ending of the eclipse and its magnitude. The dotted curves show the outline of the shadow for each hour of Greenwich mean time, and therefore pass through all places where the eclipse begins or ends at the hour indicated. To find the instant of beginning at any place, we determine by inspection between what pair of these curved lines the place is situated. The eclipse will then begin between the corresponding hours of Greenwich mean time; and the fraction of the hour may be determined by dividing the hour in the same proportion as the space representing it on the map is divided by the place in question. This division may be made a little more exact by allowing for the changes in the spaces as indicated by their varying width. The Greenwich mean time thus found must be reduced to local mean time by applying the longitude.

As an example, suppose we wish to find the times at which the eclipse of 1915, August 10, begins and ends at a point near Honolulu, latitude $21^{\circ} 18' N.$, longitude $157^{\circ} 55' W.$

For the beginning we compare the distance of the place from the curves of 9^h and 10^h , and find it to correspond to about 10 minutes from the former, thus giving for the approximate time of beginning $9^h 10^m$; for the end we compare the distance of the place from the curves of 12^h and 13^h , and find it to be about 20 minutes from the former, thus giving for the approximate time of ending $12^h 20^m$, and both of these results are probably correct to within 3 or 4 minutes.

Changing to local mean time, we shall have—

		<i>Beginning.</i>			<i>Ending.</i>		
		d	h	m	d	h	m
Greenwich mean time	August	10	9	10	10	12	20
Longitude west			10	32		10	32
Local mean time	August	9	22	38	10	1	48

In the case of total and annular eclipses, a fair estimate of the magnitude of the eclipse at any place may be obtained from the position thereof relatively to the central line and to the limit. On the central line the eclipse is annular or total, while between the central line and the limit the maximum magnitude of the eclipse is given by the quotient of the distance of the place from the limit divided by the distance of the central line from the limit; the measurements being made upon a line drawn through the place, perpendicularly to the central line.

More Accurate Computations.—A more accurate determination of the phases, as visible at any point of the Earth's surface, may be obtained from the Besselian elements which are given for every 10 minutes of Greenwich mean time. Their geometric signification is as follows:—

Let us imagine a plane passing through the center of the Earth, perpendicular to the right line joining the centers of the Sun and Moon. This latter line is the *axis of the Moon's shadow*, and the plane is called the *fundamental plane or plane*

of xy . We take the intersection of this plane with that of the Earth's equator as the axis of x , and the center of the Earth as the origin of coordinates. The axis of y is perpendicular to that of x , and directed toward the north; x and y are then the coordinates of the point in which the axis of the shadow intersects the fundamental plane, and they are here expressed in terms of the Earth's equatorial radius as unity. The angle d , of which the sine and cosine are both given, is the declination of that point of the celestial sphere toward which the axis of the shadow is directed; or, in other words, it is the declination of the center of the Sun as seen from the center of the Moon. The angle μ is the Greenwich hour-angle of this same point of the celestial sphere.

The quantities l_1 and l_2 are the radii of the shadow cones upon the fundamental plane, l_1 corresponding to the penumbra, and l_2 to the umbra, or annulus. The notation is that of CHAUVENET'S *Spherical and Practical Astronomy*, in which l_2 is regarded as positive for an annular and negative for a total eclipse.

The angles f_1 and f_2 , the tangents of which are given, are the angles which the elements of the respective shadow cones make with the axis of the shadow; or, they are the semiangles of the two cones.

In order to facilitate interpolation to any required moment, the logarithms of x' , y' , and μ' , which are the changes of x , y , and μ , in one minute of time, are given at the bottom of the table.

The method of computing an eclipse from its Besselian elements is based on the fact that at the moments of beginning and ending the distance of the observer from the axis of the shadow or penumbra is equal to the radius of the latter at the point of observation. To find this distance and radius we proceed as follows:

(1) The coordinates of the observer, ξ , η , and ζ , together with their variations in one minute, are computed for some assumed moment of Greenwich mean time, as near as practicable to the true time of the required phase.

(2) The coordinates x and y of the axis of the shadow, together with their variations in one minute, are taken for the same moment from the tables of elements.

(3) From (1) and (2) the position and motion of the observer relative to the axis of the shadow are found.

(4) The radius of the penumbra or umbra at a distance from the fundamental plane equal to that of the observer is also computed.

(5) Then, assuming the motions to be uniform, we determine the time required for the observer to be brought to a distance from the axis of the shadow equal to this radius.

The formulæ and directions for the several steps in the computation are as follows:—

(1) Find $\rho \cos \varphi'$ and $\rho \sin \varphi'$, which are the geocentric coordinates of the station referred to the Earth's equator, ρ being the distance from the center of the Earth and φ' the geocentric latitude. These coordinates may be computed from the following table based on the compression of the Earth adopted at the Paris Conference of 1911, 1/297, by the formulæ—

$$\rho \cos \varphi' = F \cos \varphi$$

$$\rho \sin \varphi' = \frac{\sin \varphi}{G}$$

φ being, as usual, the geographic latitude.

Table for Computing the Geocentric Coordinates of a Place.

φ	Log F.	Log G.
0°	0.00000	0.00293
5	0.00001	0.00292
10	0.00004	0.00289
15	0.00010	0.00283
20	0.00017	0.00276
25	0.00026	0.00267
30	0.00037	0.00256
35	0.00048	0.00245
40	0.00060	0.00232
45	0.00073	0.00220
50	0.00086	0.00207
55	0.00098	0.00195
60	0.00110	0.00183
65	0.00120	0.00173
70	0.00129	0.00164
75	0.00137	0.00156
80	0.00142	0.00151
85	0.00145	0.00148
90	0.00146	0.00146

For the assumed Greenwich mean time of computation, take from the table of elements the values of $\sin d$, $\cos d$, and μ . Then, with λ for the longitude west from Greenwich, the coordinates of the observer will be—

$$\xi = \rho \cos \varphi' \sin (\mu - \lambda)$$

$$\eta = \rho \sin \varphi' \cos d - \rho \cos \varphi' \sin d \cos (\mu - \lambda) = \eta_1 - \eta_2$$

$$\zeta = \rho \sin \varphi' \sin d + \rho \cos \varphi' \cos d \cos (\mu - \lambda) = \zeta_1 + \zeta_2$$

and their variations in one minute of mean time will be—

$$\xi' = [7.63992] \rho \cos \varphi' \cos (\mu - \lambda)$$

$$\eta' = [7.63992] \rho \sin \varphi' \sin d \sin (\mu - \lambda) = [7.63992] \xi \sin d$$

ζ' is not needed.

(2) For the same assumed moment of Greenwich mean time, take from the tables of elements the coordinates x and y of the axis of the shadow, together with their variations for one minute, which are equal to one-tenth of the differences of two consecutive numbers. These variations are represented by x' and y' , and their logarithms are given beneath the tables of x and y .

(3) The distance m and position-angle M of the axis of the shadow relatively to the observer, and the relative motions, n and N , are computed by the formulæ—

$$m \sin M = x - \xi$$

$$m \cos M = y - \eta$$

$$n \sin N = x' - \xi'$$

$$n \cos N = y' - \eta'$$

(4) Both for the shadow and for the penumbra, the radius L at the distance ζ from the fundamental plane is computed by the formula—

$$L = l - \zeta \tan f$$

l and f being found from the table of elements, and ζ computed in (1).

(5) If the time chosen for computation is exactly that of the beginning or ending of the eclipse, we shall have—

$$m = L$$

[Eph 13]

But, as this condition will rarely be fulfilled on a first trial, a correction τ to the assumed time is computed thus: Find the angle ψ from the equation,

$$\sin \psi = \frac{m \sin (M - N)}{L}$$

There will be two values for this angle, of which one will be in the first and the other in the second quadrant when $\sin \psi$ is positive, and one in the third and the other in the fourth quadrant when $\sin \psi$ is negative; but simplicity will be gained by taking only that value of ψ for which $\cos \psi$ is positive. This value lies between the limits $+90^\circ$ and -90° . The correction τ to the assumed time of beginning or ending of the eclipse will then be found, in minutes, from—

$$\tau = - \frac{m \cos (M - N)}{n} \mp \frac{L \cos \psi}{n}$$

where the double sign is to be taken negative for the beginning and positive for the ending.

However, one such pair of values of τ can not give the times of both beginning and ending with accuracy. To attain that, we must commence the computation by assuming two times, one near the beginning and the other near the ending of the eclipse, both of which may be derived from the chart with sufficient exactness. The computation for the first assumed time will give a small value of τ which, when applied to the assumed time, will give the beginning of the eclipse nearly correctly, and a large value which will give an inaccurate time of ending. Similarly the computation for the second assumed time will give a small and nearly correct value of τ for finding the time of ending, and a large and inaccurate negative value for finding the time of beginning. We shall thus deduce two times of each phase, only one of which is to be regarded as approximately correct.

The more accurate times of beginning and ending may now be taken in place of those originally assumed, and the whole computation may be repeated, thus leading to a pair of values of τ , which should be very small and accurate. Such a repetition of the computation will in general be advisable, to guard against accidental numerical errors, but a second approximation may be obtained without it, by finding a corrected value of τ in accordance with the formulæ—

$$\delta \tau = \mp \frac{\tau(l' + [5.3100]\xi \cos d)}{n \cos \psi} - \frac{[4.9788]\tau^2}{n \cos \psi} [\xi \sin (N \mp \psi) - \eta_2 \cos (N \mp \psi)]$$

$$\tau_0 = \tau + \delta \tau$$

where the double signs are to be taken negative for the beginning of the eclipse and positive for the ending. l' is the variation of l for one minute of time, and its numerical value can be taken by inspection from the table of Besselian elements.

If the resulting values of τ_0 are not greater than fifteen minutes, the corrected times of contact thus obtained will be theoretically exact within less than a second, but the uncertainties of the solar and lunar tables are such that an unavoidable error of several seconds may exist in the prediction. To guard against numerical mistakes it is better, after making this final correction, to repeat the computations so far as to obtain new values of m and L for the corrected times. If these two quantities agree within a unit of the fourth place of decimals, the times employed are generally correct within a second of time. If they differ too widely, the computer must use his own judgment as to making further corrections and computations.

Position-angle of Point of Contact.—The position-angle P , of the point of contact, reckoned from the north point of the Sun's limb toward the east, is found by the formulæ—

$$P = N - \psi \pm 180^\circ \text{ for the beginning,}$$

$$\text{or } P = N + \psi \quad \text{for the ending,}$$

being assumed that, in each case, the value of ψ is taken between the limits $\pm 90^\circ$.

Computation of the Solar Eclipse of 1915, August 10, for a point near Honolulu.

The position of the point chosen is—

$$\begin{array}{l} \text{Latitude, } \varphi = + 21^\circ 18' 0'' \\ \text{Longitude, } \lambda = + 157^\circ 55' 0'' \end{array}$$

Its geocentric coordinates are—

$$\begin{array}{l} \rho \sin \varphi' = 9.55747 \\ \rho \cos \varphi' = 9.96946 \end{array}$$

From the Eclipse Chart we find the approximate times of the phases to be—

Beginning August	d	h	m	} Greenwich Mean Time.
Ending	10	9	10	
	10	12	20	

Greenwich Mean Time, T , August 10,	Beginning.			Ending.		
	9 ^h	10 ^m	''	12 ^h	20 ^m	''
μ	136	10	24	183	40	54
λ	+ 157	55	0	+ 157	55	0
$\mu - \lambda$	- 21	44	36	+ 25	45	54
$\rho \cos \varphi'$	9.96946			9.96946		
$\sin (\mu - \lambda)$	9.56873	n		9.63817		
$\log \xi$	9.53819	n		9.60763		
ξ	- 0.34529			+ 0.40516		
$\rho \sin \varphi'$	9.55747			9.55747		
$\cos d$	9.98347			9.98355		
$\log \eta_1$	9.54094			9.54102		
η_1	+ 0.34749			+ 0.34755		
$\rho \cos \varphi'$	9.96946			9.96946		
$\sin d$	9.43254			9.43154		
$\cos (\mu - \lambda)$	9.96795			9.95453		
$\log \eta_2$	9.36995			9.35553		
η_2	+ 0.23439			+ 0.22674		
$\eta = \eta_1 - \eta_2$	+ 0.11310			+ 0.12080		
$\rho \sin \varphi' \sin d$	8.99001			8.98901		
ζ_1	+ 0.09773			+ 0.09750		
$\rho \cos \varphi' \cos d \cos (\mu - \lambda)$	9.92088			9.90754		
ζ_2	+ 0.83345			+ 0.80824		
$\zeta = \zeta_1 + \zeta_2$	+ 0.93118			+ 0.90574		
const. log	7.63992			7.63992		
$\rho \cos \varphi' \cos (\mu - \lambda)$	9.93741			9.92399		
$\log \xi'$	7.57733			7.56391		

	Beginning.	Ending
ξ'	+ 0.003779	+ 0.003664
const. log	7.63992	7.63992
$\xi \sin d$	8.97073 <i>n</i>	9.03917
log η'	6.61065 <i>n</i>	6.67909
η'	- 0.000408	+ 0.000478
$x - \xi$	- 0.47834	+ 0.31098
$y - \eta$	+ 0.25541	- 0.41735
$x' - \xi'$	+ 0.004325	+ 0.004437
$y' - \eta'$	- 0.003087	- 0.003983
$m \sin M$	9.67974 <i>n</i>	9.49273
$m \cos M$	9.40724	9.62050 <i>n</i>
tan M	0.27250 <i>n</i>	9.87223 <i>n</i>
M	- 61° 54' 0''	+ 143° 18' 33''
sin M	9.94553 <i>n</i>	9.77634
log m	9.73421	9.71639
$n \sin N$	7.63599	7.64709
$n \cos N$	7.48954 <i>n</i>	7.60021 <i>n</i>
tan N	0.14645 <i>n</i>	0.04688 <i>n</i>
N	+ 125° 31' 2''	+ 131° 54' 48''
sin N	9.91060	9.87166
log n	7.72539	7.77343
tan f	7.66403	7.66404
log ζ	9.96903	9.95700
	7.63306	7.62104
$\zeta \tan f$	+ 0.00430	+ 0.00418
l	+ 0.55479	+ 0.55445
L	+ 0.55049	+ 0.55027
$M - N$	- 187° 25' 2''	+ 11° 23' 45''
sin ($M - N$)	9.11090	9.29576
log m	9.73421	9.71639
colog L	0.25925	0.25942
sin ψ	9.10436	9.27157
ψ	+ 7° 18' 21''	+ 10° 46' 16''
log $\frac{m}{n}$	2.00882	1.94096
cos ($M - N$)	9.99635 <i>n</i>	9.99136
	2.00517 <i>n</i>	1.93232
$-\frac{m}{n} \cos (M - N)$	+ 101.198	- 85.570
log L	9.74075	9.74058
cos ψ	9.99646	9.99228
colog n	2.27461	2.22457
	2.01182	1.95743

	Beginning.	Ending.
$\mp \frac{L \cos \psi}{n}$	- 102.760	+ 90.662
τ	^m - 1.562	+ ^m 5.092
$T + \tau$	^d 10 ^h 9 ^m 8.438	^d 10 ^h 12 ^m 25.092

Since the value of τ for the ending is rather large, we compute the correction $\delta\tau$ for this phase as follows:

	Ending.		Ending.
const. log	5.3100	$\cos (N + \psi)$	9.9005 <i>n</i>
$\log \xi$	9.6076	$\log \eta_2$	9.3555
$\cos d$	9.9836	$\log \eta_2 \cos (N + \psi)$	9.2560 <i>n</i>
	4.9012	$\xi \sin (N + \psi)$	+ 0.2456
number + 0.0000080		$\eta_2 \cos (N + \psi)$	- 0.1803
l' - 0.0000023		diff.	+ 0.4259
sum + 0.0000057			
$\log (\text{sum})$	4.7559	$\log (\text{diff.})$	9.6293
$\log \tau$	0.7069	const. log	4.9788 <i>n</i>
$\text{colog } n$	2.2246	$\log \tau^2$	1.4138
$\sec \psi$	0.0077	$\text{colog } (n \cos \psi)$	2.2323
	7.6951		8.2542 <i>n</i>
(1) + 0.0050		(2)	- 0.0180
$N + \psi$	142° 41'		
$\sin (N + \psi)$	9.7826	(1) + (2) = $\delta\tau$	^m - 0.013
$\log \xi$	9.6076	τ	+ 5.092
$\log \xi \sin (N + \psi)$	9.3902	τ_0	+ 5.079

The corrected time of ending is, therefore,

$$T_0 = \text{August } 10^d 12^h 25^m.079$$

Whence we find—

		Beginning.	Ending.
Greenwich Mean Time, August		^d 10 ^h 9 ^m 8.438	^d 10 ^h 12 ^m 25.079
λ	+	10 31.667	10 31.667
Local Mean Time, August		9 22 36.771	10 1 53.412

Therefore we have—

Beginning of the Eclipse, August	^d 9 ^h 22 ^m 36 ^s 46.3	} Local Mean Time.
End of the Eclipse, August	10 1 53 24.7	

	Beginning.	Ending.
$N \mp \psi$	118 12.7	142 41.1
constant	180 0.0	0 0.0

$$\text{Angle of position: } P \quad 298 \ 12.7 \quad 142 \ 41.1$$

from the north point of the Sun's disk toward the east for direct image.

Pages 565-569 contain the adopted mean places and annual proper motions of such stars as bright as magnitude 6.5 as will be occulted during the year by the Moon.

Pages 570-608 contain the elements for the prediction of the times of occultations of stars and planets by the Moon during the current year. The system of coordinates employed is similar to that already described for eclipses, the fundamental plane passing through the center of the Earth, and being taken perpendicular to the line joining the star and the center of the Moon, but the cone circumscribing the Moon and star is regarded as a cylinder which intercepts the fundamental plane in a circle having the same linear diameter as the Moon.

In the columns referring to the star, those headed *Red'ns from 1915.0* give the quantities necessary to reduce the mean place of the star at the beginning of 1915 to its apparent place at the time of occultation. These reductions are sufficiently accurate to be definitive.

Under the general head, *At Conjunction in R. A.*, are five columns giving certain quantities for the moment of geocentric conjunction of the Moon and star in right ascension, as follows:

The *Washington Mean Time* is the moment, T , at which the two bodies are in geocentric conjunction in right ascension. At that moment the coordinate x of the axis of the cylinder on the fundamental plane has the value zero. The column *Hour Angle, H*, gives the common geocentric hour-angle of the Moon and star at the same moment, expressed in sidereal time and counted from the meridian of Washington—positive toward the west and negative toward the east. Column Y gives the coordinate y of the axis of the cylinder upon the fundamental plane at the same moment. Columns x' and y' give the variations of x and y in one hour of mean time. The linear unit in these columns is the Earth's equatorial radius. The limiting parallels, north and south, show the extreme limits of latitude within which the occultation will be visible.

By the aid of these elements, the Washington mean time of immersion and emersion of a star relatively to the limb of the Moon may be computed for any part of the Earth by a method nearly the same as that already explained for computing eclipses, but somewhat more simple.

Prediction of Occultations for a given Place.—When it is desired to predict the circumstances of one or more occultations at any place, the first step will be to select them from the general list given in the Ephemeris. The conditions of visibility are:—

1. The limiting parallels in the last columns must include the latitude of the place.
2. The quantity $H - \lambda$, taken without regard to sign, must be less than the semidiurnal arc of the star by at least one hour. On very rare occasions an emersion might be seen in the east, or an immersion in the west, when this difference is a few minutes less than an hour.
3. The Sun must not be much more than an hour above the horizon at the local mean time $T - \lambda$, unless the star is bright enough to be seen in the daytime.

When many occultations are to be selected, the most convenient course will be to write the value of $-\lambda$ on the bottom of a slip of paper, and in passing through the list of occultations to pause over each one for which condition (1) is fulfilled, and examine by means of the slip whether conditions (2) and (3) are also fulfilled. If either fails, the computer passes on. Sometimes it will be difficult to determine whether $H - \lambda$ or $T - \lambda$ falls within the limits; and in such cases the computer may

mark the occultation for trial and leave the decision for the subsequent operations. The whole list can be gone over in less than a day, and it will probably be found that about one-tenth of the occultations are marked for trial.

The next step will be to compute the local times of immersion and emersion from the elements, and to that end let—

T = the instant of geocentric conjunction of Moon and star in right ascension, expressed in Washington mean solar time;

H = the Washington west hour-angle of the two bodies at that moment;

λ = the longitude west of Washington;

$h_o = H - \lambda$ = the local hour-angle of the star at the instant T ;

δ = the star's declination.

The procedure for each occultation will then be as follows:—

(1) The geocentric coordinates of the place, $\rho \sin \varphi'$ and $\rho \cos \varphi'$, are to be computed by the formulæ and table given in connection with eclipses on page 716.

The next step will be to find the approximate instant of apparent conjunction of the Moon and star as seen from the place, and that may be deduced from the time of geocentric conjunction by the application of an approximate correction taken from DOWNS'S table, printed in the volumes of the American Ephemeris for 1882 to 1899. This correction must be reckoned in mean solar hours, and will be designated by the symbol t . It will have the same sign as h_o .

When DOWNS'S table is not available, the correction may be computed from the formulæ,

$$\xi_o = \rho \cos \varphi' \sin h_o$$

$$\xi' = [9.4192] \rho \cos \varphi' \cos^4 h_o$$

$$t = \frac{\xi_o}{x' - \xi'}$$

By applying t to the Washington mean time of geocentric conjunction, as given with the elements, we shall have the Washington mean time of local conjunction within a few minutes.

(2) Compute for the instant $T + t$ the following quantities, in which t_o is the sidereal equivalent of the mean time interval t :

$$\xi = \rho \cos \varphi' \sin (h_o + t_o)$$

$$\eta = \rho \sin \varphi' \cos \delta - \rho \cos \varphi' \sin \delta \cos (h_o + t_o) = \eta_1 - \eta_2$$

$$\xi' = [9.4192] \rho \cos \varphi' \cos (h_o + t_o)$$

$$\eta' = [9.4192] \rho \cos \varphi' \sin \delta \sin (h_o + t_o) = [9.4192] \xi \sin \delta$$

$$x = x't$$

$$y = Y + y't$$

Compute also m , M , n , N , and ψ from the equations,

$$m \sin M = x - \xi$$

$$m \cos M = y - \eta$$

$$n \sin N = x' - \xi'$$

$$n \cos N = y' - \eta'$$

$$\sin \psi = [0.5646] m \sin (M - N)$$

ψ being taken between the limits $\pm 90^\circ$. Finally compute,

$$\tau = -\frac{[1.7782]m}{n} \cos(M-N) \mp \frac{[1.2135]}{n} \cos \psi$$

$$\delta\tau = \frac{[6.7591]\tau^2}{n \cos \psi} [\eta_2 \cos(N \mp \psi) - \xi \sin(N \mp \psi)]$$

where the double signs are to be taken negative for an immersion and positive for an emersion. Both τ and $\delta\tau$ thus have two values, which are expressed in minutes of time, and in order to distinguish them let those pertaining to immersion be designated respectively τ' and $\delta\tau'$, while those pertaining to emersion are designated τ'' and $\delta\tau''$. We then have for the Washington mean times of the phases,

$$\text{Instant of immersion} = T + t + \tau' + \delta\tau'$$

$$\text{Instant of emersion} = T + t + \tau'' + \delta\tau''$$

These expressions are practically exact, as the corrections $\delta\tau$ seldom amount to so much as 1.5 minutes, and whenever an inaccuracy of that magnitude is permissible they may be omitted. As a check upon the results, it will be advisable to compute ξ , η , x , and y for the times of immersion and emersion finally obtained. If these times are correct the quantities in question will fulfill the condition,

$$\sqrt{(x-\xi)^2 + (y-\eta)^2} = 0.2725$$

If $\log m \sin(M-N) > 9.4354$, $\sin \psi$ will be numerically greater than unity, and no occultation is to be expected at the given place; but a very brief one may occur if the excess of the computed distance over the Moon's semidiameter happens to be within the errors of the ephemerides of the Moon and star.

The position-angle of the line from the Moon's center to the star, at the time of contact, is reckoned from the north point toward the east, and designated by the symbol P . It is computed from the formulæ,

$$P = N - \psi + \delta P \quad \text{for immersion,}$$

$$\text{or} \quad P = N + \psi + \delta P \pm 180^\circ \text{ for emersion,}$$

where the angles $N - \psi$ and $N + \psi$ are taken directly from the computation of $\delta\tau$, and δP is found in degrees of arc from the expression,

$$\delta P = \mp \frac{[7.3038]\tau^2}{\cos \psi} [\eta_2 \sin N + \xi \cos N]$$

In the latter formula the double sign is to be taken negative for an immersion and positive for an emersion.

The angle from the vertex, V , is also reckoned in the direction from the north toward the east, and is found from the formula,

$$V = P - C$$

where C is computed from the expression,

$$\tan C = \frac{\xi + [8.2218]\tau\xi' - [4.9810]\tau^2\xi}{\eta + [8.2218]\tau\eta' + [4.9810]\tau^2\eta_2}$$

C being taken less or greater than 180° , according as the numerator is positive or negative.

The value of τ employed in the latter formula must be so taken as to correspond with the phase for which C is required.

In the volumes of the American Ephemeris for the years 1882 to 1901 instructions are given for constructing three special tables which greatly diminish the labor of computing occultations, but as these tables should contain from 4700 to 6300 quantities, and as they would apply only to the place for which they were computed, it will rarely be worth while to undertake the labor of forming them. Those who desire further information on the subject may consult any one of the volumes in question.

As an example of an isolated occultation, we will compute that of 38 B. Sagittarii on March 8, 1915, for New Haven, whose position is—

$$\begin{aligned}\varphi &= +41^{\circ} 19' 22''.3 \\ \lambda &= -0^{\text{h}} 16^{\text{m}} 35^{\text{s}}.2\end{aligned}$$

and whose geocentric coordinates are—

$$\begin{aligned}\rho \sin \varphi' &= 9.8174 \\ \rho \cos \varphi' &= 9.8763\end{aligned}$$

From the elements on page 584 we have,

$$\begin{aligned}T &= 18^{\text{h}} 53.1^{\text{m}} \\ H &= -0^{\text{h}} 5.2\end{aligned}$$

and

$$h_0 = H - \lambda = +0^{\text{h}} 11.4$$

From the formulæ on page 723, we find the correction, t , to the Washington mean time of geocentric conjunction, T , to be about $+0^{\text{h}} 5^{\text{m}}.7$; therefore the Washington mean time of apparent conjunction is—

$$T + t = \text{March } 8^{\text{d}} 18^{\text{h}} 58^{\text{m}}.8$$

38 B. Sagittarii.	Apparent Declination.	W. T. of δ	Hour Angle.	Y	x'	y'
	$-28^{\circ} 28.1'$	$\begin{smallmatrix} \text{d} & \text{h} & \text{m} \\ \text{Mar. } 8 & 18 & 53.1 \end{smallmatrix}$	$\begin{smallmatrix} \text{h} & \text{m} \\ -0 & 5.2 \end{smallmatrix}$	$+0.6871$	0.5903	$+0.0332$

$T + t$ Mar. $8^{\text{d}} 18^{\text{h}} 58^{\text{m}}.8$		η_2	-0.3575
h_0	$+0^{\text{h}} 11.4$	$\eta_1 - \eta_2 = \eta$	$+0.9348$
t_0	$+0^{\text{h}} 5.7$	const. log	9.4192
$h_0 + t_0$	$+0^{\text{h}} 17.1$	$\rho \cos \varphi' \cos (h_0 + t_0)$	9.8751
$\rho \cos \varphi'$	9.8763	log ξ'	9.2943
sin $(h_0 + t_0)$	8.8724	ξ'	$+0.1969$
log ξ	8.7487	const. log	9.4192
ξ	0.0561	$\xi \sin \delta$	$8.4269 \text{ } n$
$\rho \sin \varphi'$	9.8174	log η'	$7.8461 \text{ } n$
cos δ	9.9440	η'	-0.0070
log η_1	9.7614	log x'	9.7711
η_1	$+0.5773$	log t	8.9781
$\rho \cos \varphi'$	9.8763	log x	8.7492
sin δ	$9.6782 \text{ } n$	x	$+0.0561$
cos $(h_0 + t_0)$	9.9988	log y'	8.5211
log η_2	$9.5533 \text{ } n$	log $y't$	7.4992

$T+t$ Mar.	8 ^d 18 ^h 58 ^m .8	const. log	0.5646
$y't$	+0.0032	log m	9.3883
Y	+0.6871	sin $(M-N)$	9.9977
y	+0.6903	sin ψ	9.9506
$x-\xi$	0.0000	ψ	63° 11'
$y-\eta$	-0.2445	const. log	1.7782
$x'-\xi'$	+0.3934	log $\frac{m}{n}$	9.7912
$y'-\eta'$	+0.0402	cos $(M-N)$	9.0070 ^m
$m \sin M$	—		0.5764 ^m
$m \cos M$	9.3883 n		
tan M	—	$-\frac{[1.7782]m}{n} \cos (M-N)$	+ 3.77
M	180° 0'	const. log	1.2135
cos M	0.0000 n	colog n	0.4029
log m	9.3883	cos ψ	9.6543
$n \sin N$	9.5948		1.2707
$n \cos N$	8.6042		
tan N	0.9906	$\mp \frac{[1.2135] \cos \psi}{n}$	∓ 18.65
N	84° 10'		
sin N	9.9977	τ for immersion	- 14.88 ^m
log n	9.5971	τ for emersion	+ 22.42

The computation of $\delta\tau$ for the two contacts is as follows:

	Immersion.	Emersion.
$N \mp \psi$	20° 59'	147° 21'
cos $(N \mp \psi)$	9.9702	9.9253 ^m
log η_2	9.5533 n	9.5533 ^m
log (1)	9.5235 n	9.4786
(1)	-0.3338	+0.3010
sin $(N \mp \psi)$	9.5540	9.7320
log ξ	8.7487	8.7487
log (2)	8.3027	8.4807
(2)	+0.0201	+0.0302
(1) - (2)	-0.3539	+0.2708
log [(1) - (2)]	9.5489 n	9.4326
const. log	6.7591	6.7591
log τ^2	2.3452	2.7012
colog $(n \cos \psi)$	0.7486	0.7486
log $\delta\tau$	9.4018 n	9.6415
$\delta\tau$	- 0.25 ^m	+ 0.44 ^m
$\tau + \delta\tau$	- 15.13	+ 22.86
$T+t$	Mar. 8 ^d 18 ^h 58 ^m .8	18 ^h 58 ^m .8
Washington Mean Time of Phase,	" 8 18 43.7	19 21.7
λ	- 0 16.6	- 0 16.6
New Haven Mean Time	Mar. 8 19 0.3	19 38.3

To find δP and P :

$\log \eta_2$	9.5533 <i>n</i>	$\log \xi$	8.7487	(3) - 0.3556
$\sin N$	9.9977	$\cos N$	9.0071	(4) + 0.0057
$\log (3)$	9.5510 <i>n</i>	$\log (4)$	7.7558	(3) + (4) - 0.3499
		Immersion.		Emersion.
$\log [(3) + (4)]$		9.5439 <i>n</i>		9.5439 <i>n</i>
const. log		7.3038 <i>n</i>		7.3038
$\log r^2$		2.3452		2.7012
colog $\cos \psi$		0.3457		0.3457
$\log \delta P$		9.5386		9.8946 <i>n</i>
δP		+ 0.3		- 0.8
$N \mp \psi$		21.0		147.4
constant		0.0		180.0
Angle of position: P		21.3		326.6

from the north point of the Moon's limb toward the east, for direct image.

Pages 609-610 contain in detail all the data necessary for observing every occultation of the general list which is visible at Washington during the current year.

Page 611 contains the *Ephemeris for Physical Observations of the Sun*.

Pages 612-619 contain the *Ephemeris for Physical Observations of the Moon*. The selenographic longitudes are measured in the plane of the Moon's equator, the axis of reference being the radius of the Moon which passes through the mean center of the visible disk, positive toward the west—i. e., toward Mare Crisium—and the latitudes are measured from the Moon's equator, positive toward the north—i. e., in the hemisphere containing Mare Serenitatis.

The optical and physical librations in longitude and latitude have been computed with elements and formulæ given on page xi, and their sums are given in the second and third columns, respectively, the physical libration being given separately in the fourth and fifth columns. The Sun's selenographic colongitude (90° - longitude) and latitude and the position-angle of the Moon's axis, C , in the sixth, seventh, and eighth columns, respectively, have all been corrected for the effect of physical libration.

When the libration in longitude is positive, the mean center of the disk is displaced toward the east—that is, the region thus exposed to view is on the west limb—and when the libration in latitude is positive the mean center of the disk is displaced toward the south—that is, the region thus exposed to view is on the north limb.

The altitude of the Sun, A , at any given time above the horizon of any point on the Moon whose selenographic longitude and latitude, λ and β , are known, may be computed from the following formula, the Sun's selenographic longitude and latitude being denoted by l_\odot and b_\odot , respectively:

$$\sin A = \sin b_\odot \sin \beta + \cos b_\odot \cos \beta \cos (l_\odot - \lambda)$$

Pages 620-621 contain the data with reference to the illuminated disks of Mercury and Venus. The angle θ is the angle which the arc of the great circle from the planet to the Sun makes with the arc from the planet toward the west

measured in the direction west, north, east, south. It is measured from 0° to 360° . We may also regard θ as expressing the angle which the line of cusps makes with the meridian, the positive direction of the meridian being toward the north, and the positive direction of the line of cusps that in which a person following this line would have the illuminated portion of the disk on his right.

Pages 622–625 contain the *Ephemeris for Physical Observations of Mars*. The quantities here given have been corrected for aberration, so that in using them they should be interpolated to the actual time of observation.

P is the position-angle of the axis of rotation measured eastward from the north point of the disk.

A_\oplus and A_\odot are the planetocentric right ascensions of the Earth and Sun, respectively, measured in the plane of the planet's equator from its vernal equinox.

D_\oplus and D_\odot are the planetocentric declinations of the Earth and Sun, respectively, referred to the planet's equator.

$\odot \delta$ is the planetocentric longitude of the Sun measured in the plane of the planet's orbit from its vernal equinox.

k is the ratio of the area of the illuminated portion of the apparent disk to the area of the entire apparent disk regarded as circular.

i is the angle between the Sun and the Earth as seen from the planet.

q is the angular value of the greatest defect of illumination as seen from the Earth.

Q is the position-angle of the radius of the disk which passes through the point of greatest defect of illumination—that is, of the radius perpendicular to the line joining the cusps. It is measured eastward from the north point of the disk.

The column headed *Central Meridian* contains the longitude of the meridian which bisects the disk, measured from the adopted zero meridian.

The columns headed *Transit of Zero Meridian* contain the Washington Mean Time of every transit of the zero meridian across the actual center of the disk.

Pages 626–629 contain the *Ephemeris for Physical Observations of Jupiter*.

The columns headed *Central Meridian* contain the longitudes of the meridian which bisects the disk, measured from the adopted zero meridian of System I and System II, respectively.

The column headed *Correction for Phase* contains the corrections to be applied to the longitudes of the central meridian to obtain the longitudes of the meridian bisecting the illuminated disk.

The column headed *Transit of Zero Meridian* contains the Washington Mean Time of every fifth transit of the zero meridian across the center of the illuminated disk.

The quantities in the remaining columns on pages 626–627 are the same as those defined under the *Ephemeris for the Physical Observations of Mars*.

Pages 630–655 contain, concerning the *Satellites of Jupiter*, the times of conjunction of Satellites I–IV, the times of elongation of Satellite V, the differences in right ascension and declination between Jupiter and Satellites VI and VII, and the phenomena of the Satellites I–IV together with their configurations.

Page 656 contains the *Magnitude of Saturn* and the *Elements of the Rings*.

Pages 657–663 contain, concerning the *Satellites of Saturn*, the diagram of the orbits of the seven inner satellites, the times of elongation for the first eight

satellites, the differences in right ascension and declination between Saturn and Phoebe, the ninth satellite, and tables for predicting the position-angles and distances from the center of the planet of the first eight satellites.

Page 664 contains the diagram of the orbits of the satellites of Uranus, together with the times of their elongations.

Pages 665-666 contain tables for predicting the position-angles and distances from the center of the planet of the satellites of Uranus and Neptune.

Page 667 contains the diagram of the orbit of the satellite of Neptune, together with the times of its elongations.

Pages 668-669 contain the *Phenomena*. The predicted times of the conjunctions, quadratures, and oppositions of the planets with respect to the Sun are, respectively, the instants when the longitude of each planet differs from that of the Sun by 0° , $\pm 90^\circ$, or 180° . For the conjunction of the planets with the Moon and with each other the predicted times are the instants when the two bodies have the same right ascension. The degrees and minutes to the right show the difference of declination at the moment of conjunction.

Pages 670-679 contain the *Positions of Observatories*. These have been compiled from various sources, and the data used are the best immediately available. The tabular arrangement is self-explanatory.

Page 680 contains two examples in the computation of lunar distances, which are inserted because the lunar distance tables have been omitted from the American Ephemeris since 1911.

Pages 681-699 contain a series of tables numbered from I to VI.

Table I—*For Finding the Latitude by an Observed Altitude of Polaris.*

Table II—*For converting Sidereal into Mean Solar Time.*

Table III—*For converting Mean Solar into Sidereal Time.*

Table IV—*For Finding the Azimuth of Polaris at All Hour Angles.*

Table V—*For Finding the Azimuth of Polaris at Elongation.*

Table VI—*For Finding the Times of Upper and Lower Culmination of Polaris.*

The following-named persons were engaged in the preparation of the American Ephemeris and Nautical Almanac for the year 1915:

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